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ABSTRACT

This document reviews the role of the state and land-grant universities in America. Emphasis is placed on historical background and the role of these schools in light of recent developments. The first chapter concerns enrollment trends, changing emphasis on career goals, response to students, the arts, advanced placement, the honor student, grading innovations, flexible curriculum, degrees with no majors, design-your-own-degree programs, external degrees, new tools, institutional size, freshman preparation, graduate education, law and medicine, and joint medical programs. The second chapter reviews developments in research in the areas of teaching, science, environment, health, defense, industry, and medical engineering. Chapter three indicates the results of research and indicates examples. Chapter four reports developments in college community relations; chapter five indicates the urban challenge; chapter six reviews equal opportunities; and chapter seven encompasses developments and international education. Chapter eight highlights developments in the role of women on the campus. The epilogue praises the achievements of higher education yet indicates the need to continue development to meet the needs of the future. (MJM)

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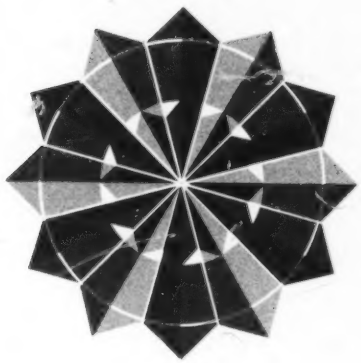
People to People



The Role of State and Land-Grant Universities in Modern America

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People to People

The Role of State and Land-Grant Universities in Modern America

By
Lucrece Beale

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about the National Association of State Universities and Land-Grant Colleges

The National Association of State Universities and Land-Grant Colleges (NASULGC) is the nation's oldest higher education association. It evolved from three separate groups which were established to represent special segments of public colleges and universities.

The earliest group to form a permanent organization was the land-grant institutions. In October, 1887, representatives of these colleges met in Washington for the first time as the new Association of American Agricultural Colleges and Experiment Stations. In 1895 a second higher education association, the National Association of State Universities, was founded.

Both the name and structure of the organization for land-grant institutions changed several times over the years to reflect the developing character and broadening interests of its members. It also became more and more apparent that all state universities shared many similar problems, objectives and opportunities. Therefore, the two pioneer associations along with The State Universities Association set up an ad hoc committee, composed of representatives of each group, to study the possibility of a merger. As a result the three associations were consolidated into the National Association of State Universities and Land-Grant Colleges in 1963.

Today the association consists of 128 universities and colleges, including:

- .71 land-grant institutions
- .32 state universities
- .1 urban university
- .24 major campuses of multi-campus universities

Alabama
*Alabama A&M University
*Auburn University
University of Alabama

Alaska
*University of Alaska

Arizona
Arizona State University
*University of Arizona

Arkansas
*University of Arkansas
*University of Arkansas, Pine Bluff

California
*University of California
University of California, Berkeley
University of California, Davis
University of California, Irvine
University of California, Los Angeles
University of California, Riverside
University of California, San Diego
University of California, Santa Barbara

Colorado
*Colorado State University
University of Colorado

Connecticut
*Connecticut Agriculture Experiment Station
*University of Connecticut

Delaware
*Delaware State College
*University of Delaware

District of Columbia
*Federal City College

Florida
*Florida A&M University
Florida State University
*University of Florida

Georgia
*Fort Valley State College
Georgia Institute of Technology
*University of Georgia

---

*Land-Grant Institutions

Guam
*University of Guam

Hawaii
*University of Hawaii

Idaho
*University of Idaho

Illinois
Southern Illinois University
*University of Illinois
University of Illinois, Chicago Circle
University of Illinois, Urbana-Champaign

Indiana
Indiana University
Indiana University, Bloomington
*Purdue University

Iowa
*Iowa State University
University of Iowa

Kansas
*Kansas State University
University of Kansas

Kentucky
*Kentucky State University
*University of Kentucky

Louisiana
*Louisiana State University
*Southern University

Maine
*University of Maine
University of Maine, Orono

Maryland
*University of Maryland
University of Maryland, College Park

Massachusetts
*Massachusetts Institute of Technology
*University of Massachusetts
University of Massachusetts, Amherst

Michigan
*Michigan State University
University of Michigan
Wayne State University

Minnesota
*University of Minnesota

Mississippi
*Alcorn A&M College
*Mississippi State University
University of Mississippi

Missouri
*Lincoln University
*University of Missouri
University of Missouri, Columbia

Montana
*Montana State University
University of Montana

Nebraska
*University of Nebraska
University of Nebraska, Lincoln

Nevada
*University of Nevada, Reno

New Hampshire
*University of New Hampshire

New Jersey
*Rutgers, The State University of New Jersey

New Mexico
*New Mexico State University
University of New Mexico

New York
City University of New York
*Cornell University
State University of New York
State University of New York, Albany
State University of New York, Binghamton
State University of New York, Buffalo
State University of New York, Stony Brook

North Carolina
*North Carolina A&T State University
*North Carolina State University
University of North Carolina
University of North Carolina, Chapel Hill

North Dakota
*North Dakota State University
University of North Dakota

Ohio
Kent State University
Miami University
*Ohio State University

Oklahoma
*Langston University
*Oklahoma State University
University of Oklahoma

Oregon
*Oregon State University
University of Oregon

Pennsylvania
*Pennsylvania State University
Temple University
University of Pittsburgh

Puerto Rico
*University of Puerto Rico

Rhode Island
*University of Rhode Island

South Carolina
*Clemson University
*South Carolina State College
University of South Carolina

South Dakota
*South Dakota State University
University of South Dakota

Tennessee
*Tennessee State University
*University of Tennessee
University of Tennessee, Knoxville

Texas
*Prairie View A&M College
*Texas A&M University System
Texas Southern University
Texas Tech University
University of Houston
University of Texas System
University of Texas, Austin

Utah
University of Utah
*Utah State University

Vermont
*University of Vermont

Virgin Islands
*College of the Virgin Islands

Virginia
University of Virginia
*Virginia Polytechnic Institute and State University
*Virginia State College

Washington
University of Washington
*Washington State University

West Virginia
*West Virginia University

Wisconsin
*University of Wisconsin
University of Wisconsin, Madison
University of Wisconsin, Milwaukee

Wyoming
*University of Wyoming

Thirty-Seventh Congress of the United States of America;

At the Second Session,

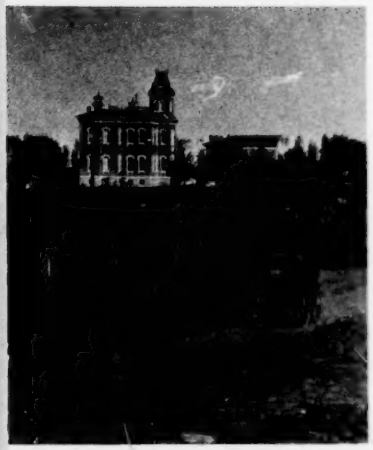
Begun and held at the city of Washington, on Monday, the Second day of December, one thousand eight hundred and sixty-one.

AN ACT

Donating public lands to the several States and Territories which may provide colleges for the benefit of agriculture and the mechanic arts.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That there be granted to the several States for the purposes hereinafter mentioned an amount of public land to be apportioned to each State a quantity equal to thirty thousand acres for each Senator and representative in Congress to which the States are respectively entitled by the apportionment under the census of eighteen hundred and sixty: Provided, That no mineral lands shall be selected or purchased under the provisions of this act. Sec. 2 And be it further enacted, That the land aforesaid, after being surveyed, shall be apportioned to the several States in sections or subdivisions of sections, not less than one quarter of a section, and whenever there are public lands in a State, subject to sale at private entry at one dollar and twenty-five cents per acre, the quantity to which said State shall be entitled shall be selected from such lands within the limits of such State, and the Secretary of the Interior is hereby directed to issue to each of the states in which there is not the quantity of public lands subject to sale at private entry at one dollar and twenty-five cents per acre to which said state may be entitled under the provisions of this act, land scrip to the amount in acres for the deficiency of its distributive share; said scrip to be sold by said States and the proceeds thereof applied to the uses and purposes prescribed in this act and for no other use or purpose whatsoever: Provided, That in no case shall any State to which land scrip may thus be issued, be allowed to locate the same within the limits of any other State, or any Territory of the United States but their assignees may thus locate said land scrip upon any of the unappropriated lands of the United States subject to sale at private entry at one dollar and twenty-five cents or less per acre. And provided further, that not more than one million acres shall be located by such assignees in any one of the States, And provided further that no such location shall be made before

The Beginnings



Colorado State University, about 1885

For almost two centuries the principal state and land-grant universities of America have sought to pursue the fundamental ideal that educational opportunity should be for all the people.

These institutions accepted a new responsibility to the public from the start. They developed from the great chartered state universities of the Eighteenth Century, planned and established in the infancy of the Republic. They are direct outgrowths of a public hostility to purely denominational education which sprang up in the United States of America on the heels of the Revolutionary War. They include among their numbers the Twentieth Century manifestations of the Jacksonian ideal embodied in the landmark 1862 Land-Grant Act, which vastly expanded educational opportunities for the youth of a westward-looking nation.

The oldest state universities in this group of unique American institutions are the University of Georgia, chartered as the nation's first state-supported university in 1785, a scant nine years after the Declaration of Independence; the University of North Carolina, which was chartered in 1789 and became the first state-supported institution to accept and graduate students; the University of Vermont, chartered in 1791; the University of Tennessee, established in 1794 when the state was still "frontier" and the University of South Carolina, founded in 1801 with the desire to unite a state gravely torn by rivalries growing out of the Revolutionary War.

Two other universities, which eventually became the land-grant universities for their respective states, were established as private institutions earlier than the first state universities. They were the University of Delaware, established in 1744 as an academy by the Presbyterian Synod of Philadelphia and Rutgers, founded as Queen's College in the colony of New Jersey by royal charter in 1766.

The number of state universities grew rapidly in the Nineteenth Century, including in their ranks the Universities of Michigan, Minnesota and Wisconsin—institutions which achieved for public universities a new and special identity.

From their inception, the major state universities of the country contested the emphasis in American higher education on an exclusive, classics-oriented curriculum. Their models were the emerging universities in Germany and the democratic idealism of the University of London.

These institutions rejected the philosophy of the 1828 "Yale Report"—an attempt by a prestigious American university to shape definitively the goal of U. S. higher education as: "discipline and furniture of the mind." For the growing numbers of reformers in American higher education—men who believed in universal suffrage and in what one historian calls "the inevitability of material and moral progress"—the mind was not just a receptacle. For them, the consensus was fundamental: "Let knowledge grow from more to more, and thus be human life enriched."

Historic Legislation

The rising tide of democratic idealism reached a high point in the midst of savage civil strife. On July 2, 1862, Abraham Lincoln signed a bill far less famed than the Emancipation Act to which he had affixed his signature six months earlier, but one which achieved such an impact that the benefits it has brought to the United States have been called beyond measure.

This was the Land-Grant Act, written and shepherded through Congress by Vermont's Senator Justin S. Morrill. The bill provided for "the endowment, support and maintenance of at least one college in each state where the leading object shall be, without excluding other scientific and classical studies, and including military tactics, to teach such branches of learning as are related to agriculture and the mechanic arts . . . in order to promote the liberal and practical education of the industrial classes."

Land grants were made to the states on a basis of 30,000 acres for each member of Congress. The income from the sale of the land would endow the colleges and the states were to be the administrators.

Altogether, the federal government gave almost 11,383,000 acres of land for the establishment of land-grant colleges and universities. Today there is at least one land-grant college in each of the 50 states, plus the District of Columbia, Puerto Rico, Guam and the Virgin Islands.

A turn-of-the-century Minnesota senator, Knute Nelson, said of the Land-Grant Act:

"It has wrought a revolution in American education. . . . The system of education is now suited to the needs alike of workers, businessmen, homemakers, technicians and professionals."

A Time of Ferment

To understand just how much of a revolution the Land-Grant Act represented it is necessary to recall the temper of the time in which the act was enacted. Then, no less than now, the nation was in ferment. Public opinion was bitterly divided as the United States was entering a new era, shifting from a predominantly agricultural economy to a new industrial age. Faced with the changes, many rural Americans were perplexed and some were skeptical about what the future held.

As always, youth was demanding change and there was a movement in support of education for the many, not just the few. Hitherto, colleges and universities had stressed the classics in training members of the clergy, lawyers and teachers. But now there emerged a strong need for a wider educational program in colleges and universities and, above all, a demand for wider educational opportunity for youth.

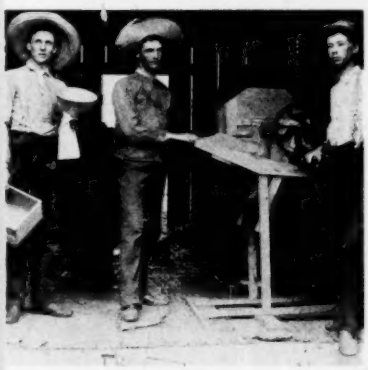
Many educators in the mid-1800's wanted to do something about education in the fields of agriculture and the mechanical arts. Jonathan B. Turner of Illinois was one of the most persistent of these crusaders. He developed a "Plan for a State University for the Industrial Classes," which he presented at a meeting of the Illinois Teachers' Institute in 1850. This plan contained, in embryonic form, most of the ideas later incorporated in the Morrill Act of 1862.

As a result of the trailblazing of such men as Turner and in response to the obvious need, the Morrill Bill was enacted and so began, in the words of historian Allan Nevins, professor emeritus of Columbia University, "one of the most impressive chapters in the history of higher education throughout the world."

From this forward-looking legislation, there evolved in time such great centers of learning as the University of California, Michigan State, Iowa State, the University of Missouri, Auburn University, Cornell and the Massachusetts Institute of Technology.

No Patterns or Precedents

The early development of the land-grant institutions was as storm-tossed as that of most such innovative state or federally sponsored programs. Mistakes were numerous. Enemies were made. Argument was unceasing. There was neither pattern nor precedent for the new curricula. There was, in fact, no science of agriculture or the mechanic arts. No trained faculty. No methods of instruction. And few students with sufficient secondary school education.



Early agriculture students at Kansas State University

It was not that science as applied to the problems of agriculture or the mechanic arts was unheard of prior to the first land-grant college. The moldboard plow and Cyrus McCormick's reaper were already in use on the farms. And the Industrial Revolution was beginning in America.

But many believed science not a fit subject for Christian study. One Nineteenth Century New England newspaper editor opposed a civic plan for street lighting by saying: "Artificial lighting is an attempt to interfere with the divine plan of the world which called for dark during the night time."

So it is not surprising that many farmers begrudged the "new education." Some had little use for new-fangled notions and certainly none for Plato on the farm. As one farmer is alleged to have put it: "What you goin' to do with that college up there? Larn 'em to rake 'arder?"

A good question and no one quite knew the answer because, in the beginning, it was often a case of the blind leading the blind. The very lack of agricultural curriculum drove dedicated educators at many institutions to work on local or college farms where they investigated farm problems firsthand and sought to solve them by research and experimentation. This led to a reconciliation between farmer and academician. Each side became more respectful of the other.

The situation was slightly different with the teaching of the mechanic arts. Other institutions had pioneered in the field, and the value of book-learning for engineers was not questioned. But there was disagreement as to what mechanic arts education meant. Some said that it meant education for the trades; others considered it to be technical education at the highest possible level.

Shop practice and practical training constituted the bulk of the early curriculum. The output of college shops—castings, forgings and machinery—were displayed in order to convince the public of the value of the training. At first, the only field of engineering taught was civil. But by 1870 courses in mechanical engineering began to appear followed by the development of electrical engineering as a separate field. The

land-grant colleges built their engineering courses on a strong scientific foundation of chemistry, mathematics and physics which caused them to exert a dominant influence on engineering education and brought about the joint growth of both science and engineering as fields of study.

As the requirements of industry grew, the colleges responded by adding more courses and subdividing the field into a large numbers of majors and then schools. Thus in the mechanic arts the land-grant institutions provided an early example of their commitment to providing answers to both national and local needs.

The Hatch and Smith-Lever Acts

Research and experimentation proved so successful—and, in fact, necessary to the study of agriculture as a science—that in 1887 Congress passed the Hatch Act, which established an agricultural experiment station in every state in connection with a land-grant college.

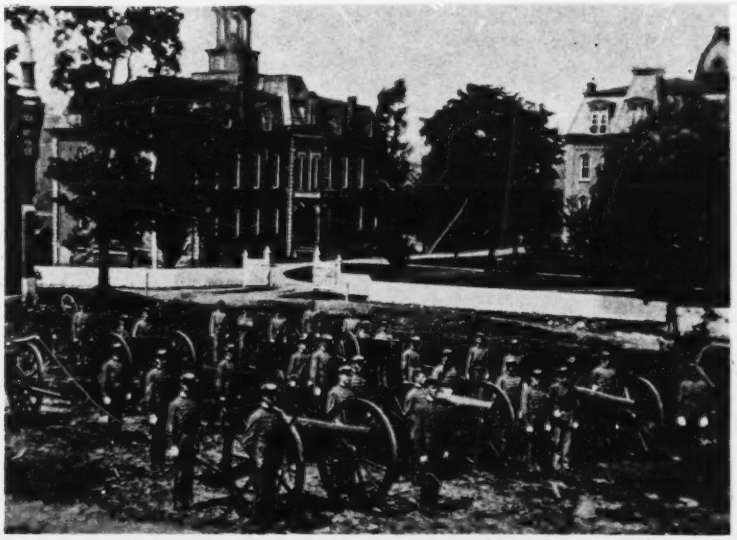
Today these stations are considered to be among the best tools of agricultural scientific inquiry in the world. The results of their research, from new strains of seed and fodder and the control of disease and insects to food rating and testing, have been an incalculable boon to the state and national economies.

To transfer the results of research to those who needed it most, the land-grant colleges arranged to set up "extension" courses for farmers unable to come to the campus. Demonstration farming showed how to use improved methods of agriculture to raise better crops. Home economics departments wrote pamphlets and helped women to improve rural home life through instruction in meal-planning, the use of labor-saving devices and interior decorating.

In 1914, Congress passed the Smith-Lever Act which gave recognition to these early successes and the funds to the land-grant institutions to carry them on by establishing extension programs in every state. Thus the triumvirate of teaching, research and extension was formed. It is at the heart of the land-grant philosophy.

Coeds at Iowa State University in 1890s

1920 machine shop at Texas A&M University



Nineteenth century military training at West Virginia University

The 1890 Colleges

Seventeen Southern states established predominantly black colleges or designated existing institutions to receive land-grant funds under authority of the Second Morrill Act, passed by Congress in 1890. The Act contained a historic provision barring money from colleges which did not offer admission to blacks, although the funds were to be granted to segregated colleges in states where there were separate schools for blacks and whites.

The black land-grant colleges established under this bill were far from being "equal" institutions of educational opportunity. But they did supply opportunity for many who otherwise would have had none.

Despite many problems and setbacks, these colleges today have developed into viable institutions of higher education which play a major role in educating minority students for full and productive participation in American life.

Women's Educational Opportunities

One of the distinctive contributions of the land-grant spirit was the belief and demonstration one hundred years before the women's liberation movement that females had brains enough to do college work. Land-grant and state universities were among the first coeducational institutions of higher education in the nation.

Some problems arose in finding relevant course matter for women, however. To finance their education they were required to work in the kitchen, and out of this venture came the first stage in an ever broadening home economics program which applied the discoveries of chemistry and the sciences to home and kitchen. Today, departments of home economics offer courses in nutrition, textile designing, family counseling and child development. In addition, they require their students to take prescribed courses in the natural and social sciences and in the humanities.

Military Science

A requirement to offer a course or courses in military tactics was written into the Morrill Act. Perhaps one of the reasons for Congressional passage of the Land-Grant Act was a belief that a prosperous agriculture was an important element in national defense. Furthermore, in 1862, the

Union was in peril. The flower of the military ability in the country was in the South and the Federal armies badly needed trained men. Thus, the Congress gladly included the military tactics provision in the bill.

The Reserve Officers Training Corps was the product of the National Defense Act of 1916. ROTC programs were then established at most land-grant colleges and served to meet the legal requirement for instruction in military tactics. However, ROTC is now a student elective rather than a requirement on almost all of these campuses.

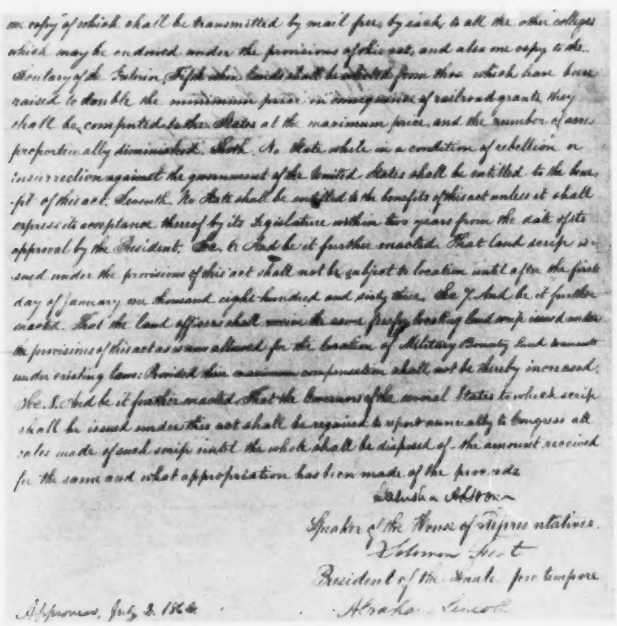
A Demand for Experts

National efficiency at the time of World War I called for the services of experts in great variety—chemists, physicists, biologists, psychologists and engineers. The people of the United States acquired a new sense of the value of experts and of the institutions which train them.

The state and land-grant universities were well-prepared to meet this new demand for expertise. Undergraduate curricula had gradually broadened to include all areas of scientific and liberal education and graduate schools of excellence were being formed.

Through the years the expansion has continued. Today's state and land-grant universities offer courses encompassing all fields of knowledge, conduct research which constantly expands this knowledge and carry their knowledge to all the people of this country through a variety of extension programs.

In every sense they are people's colleges for people's problems.

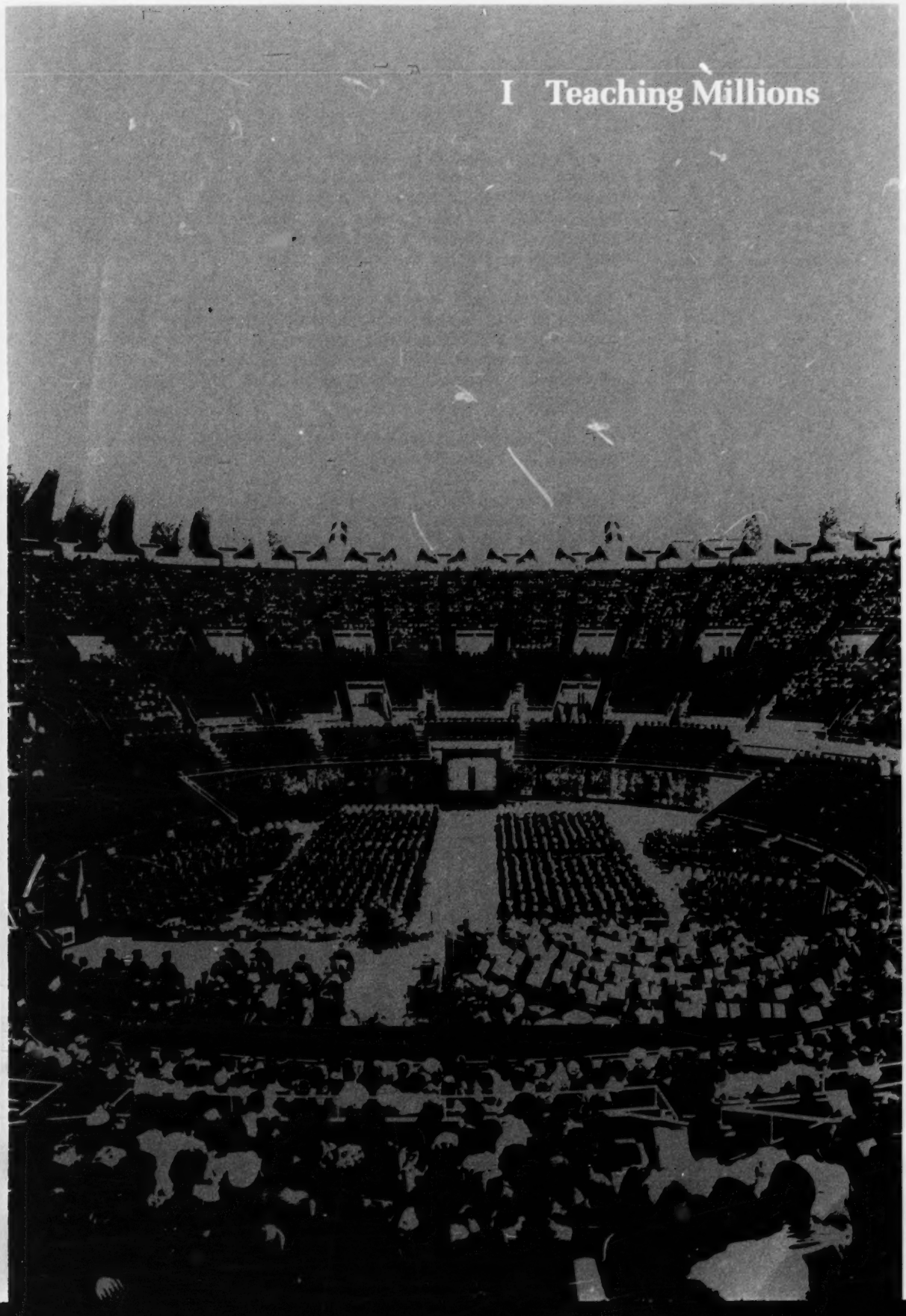


one copy of which shall be transmitted by mail free by each, to all the other colleges which may be endowed under the provisions of this act, and also one copy to the Secretary of the Interior, [illegible] shall be entitled from those which have been raised to double the minimum price in consequence of railroad grants they shall be computed at the States at the maximum price, and the number of acres proportionally diminished. Sixth. No State while in a condition of rebellion or insurrection against the government of the United States shall be entitled to the benefit of this act. Seventh. No State shall be entitled to the benefits of this act unless it shall express its acceptance thereof by its Legislature within two years from the date of its approval by the President. Sec. 6. And be it further enacted, That Land scrip issued under the provisions of this act shall not be subject to location until after the first day of January one thousand eight hundred and sixty three. Sec. 7. And be it further enacted, That the Land officers shall receive the same fees for locating Land scrip issued under the provisions of this act as are allowed for the location of Military Bounty Land warrants under existing laws: Provided, that no compensation shall be thereby increased. Sec. 8. And be it further enacted, That the Governors of the several States to which scrip shall be issued under this act shall be required to report annually to Congress all sales made of such scrip until the whole shall be disposed of, the amount received for the same and what appropriation has been made of the proceeds.

Galusha A. Grow
Speaker of the House of Representatives.
Solomon Foot
President of the Senate pro tempore.

Approved, July 2, 1862. A. Lincoln

I Teaching Millions



Early biology class at University of Maryland, College Park

Teaching Millions

The primary function of a university is teaching. To be viable, a university must teach what is relevant to the needs of its students. It is the task of the educator to determine changing educational demands and to adjust to them. The nation's major state universities and its land-grant universities and colleges, being public institutions, have always accepted a particular responsibility in this area.

These colleges and universities, all members of the National Association of State Universities and Land-Grant Colleges, today have introduced innovations into curricula that were undreamed of even a decade ago. They have sought to utilize new teching techniques, to speed up the educational process and to meet the particular needs of a rapidly changing society.

The effort has not been 100 percent successful. But the recognition of the requirement to respond to public needs is especially acute.

The 128 state universities and land-grant colleges which hold membership in the National Association of State Universities and Land-Grant Colleges carry a disproportionate share of the responsibility for educating students. Although they represent less than five percent of the nation's more than 2,500 colleges and universities, they enroll approximately 31 percent of all students. In fall 1972 they enrolled more than 2.8 million of the approximately 9.2 million students enrolled in all higher education institutions in the nation.

The percentage of all degrees awarded by the principal state universities and land-grant colleges and universities is even higher than enrollment figures. These institutions award about 36 percent of all bachelor's and first professional degrees, 42 percent of all master's degrees and 64 percent of all doctorates.

A Changing Emphasis

Agriculture remains a major concern of the land-grant universities but these institutions never were and never intended to be mere vocational schools. As written into the Morrill Act, the humanities were "not to be excluded." As the need to educate the "whole man" became more apparent, the state and land-grant colleges and universities responded by lessening their scientific requirements and broadening the elective base to include more work in liberal arts, social science and the humanities.

Michigan State University Veterinary Clinic is typical of land-grant institution training facilities.

The success of Sputnik and the public's demand that the United States "catch up" with the Russians caused a rush back to the physical sciences. When it became clear that science and technology alone could not provide all the answers to the problems of mankind, the pendulum swung back, and today most universities require agriculture and engineering students to take as much as 50 percent of their courses in non-scientific fields.

In recent years there has been a changing emphasis in the teaching of vocational subjects from "how-to" to "why." Agriculturists recognize that the modern farmer, to succeed, must be a combination naturalist, scientist, economist and businessman.

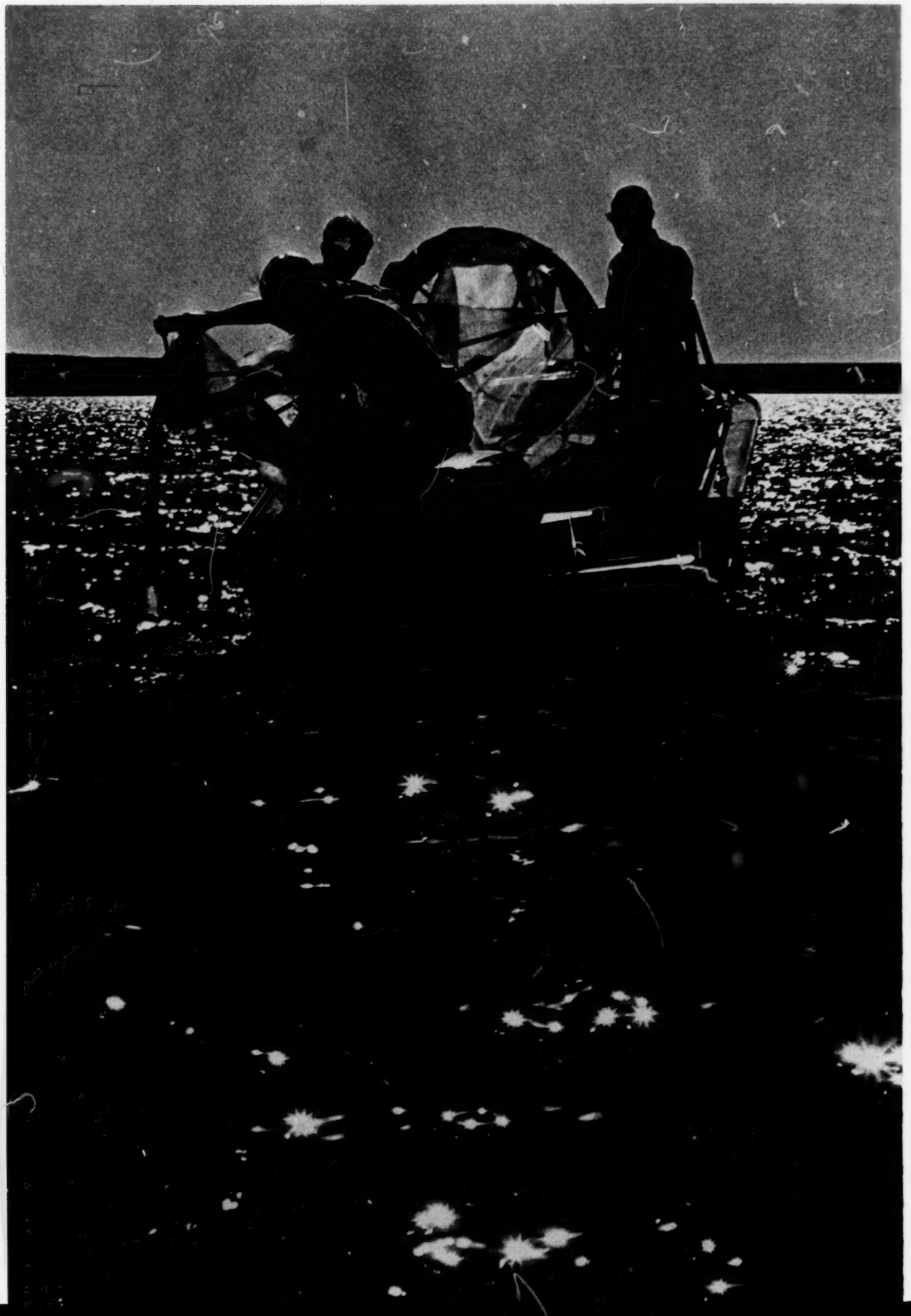
A similar adjustment is taking place in engineering schools, which seek to train students to function as intelligent community leaders rather than narrowly-trained technologists. The trend is away from "hardware courses"—drawing, shop and demonstration laboratories. There is an increased emphasis on basic science and mathematics and required courses in liberal arts, social science and the humanities, aimed at producing literacy in the socioeconomic-political fields as well as literacy in scientific and technological fields.

In veterinary medicine, the new goal is to produce not just a vet but a well-rounded community leader and well-informed citizen. There are 18 colleges of veterinary medicine in the United States (all except one at a land-grant institution) and they are steadily broadening and improving their teaching programs to include required courses in social sciences, humanities and general science.

Perhaps the major problem for today's veterinary schools is turning out enough graduates. It is estimated that there is a present shortage of 10,000 veterinarians in the United States and the ratio of demand to supply is expected to increase dramatically in the next 15 years.

Response to Students

Besides changing the emphasis and enlarging the scope in agricultural and engineering schools, the state and land-grant universities have responded to student demands for relevancy and involvement by adding new courses and degrees and changing requirements in nearly all disciplines.



Ecological studies are expanding at a rapid rate and an increasing number of universities are offering degrees in the various environmental sciences. A growing number of universities are inaugurating or expanding ethnic programs, with particular emphasis on Afro-American and American Indian studies. Courses dealing with women's new role in society reflect interest in the women's lib movement. New colleges are being set up within a number of universities and new graduate and undergraduate degrees are widening the choice of students' majors.

An example of new studies is the University of Alaska's inauguration of two unique major programs—a Peace Arts major, designed to prepare students for a professional career in achieving and maintaining peace, and a Northern Studies major, to give students a broader look at the environment, peoples and problems in the Northern regions of the world.

Core curriculum requirements, or those things commonly required by most universities of all students, are being greatly revised, and, in some cases, completely eliminated.

The University of Rhode Island, for example, has done away with that old bugaboo, Freshman Composition, formerly required of all incoming students. The chairman of the English Department called it the "most despised subject listed in the catalogue" and said, "After all, no other university system in the world teaches its native students their own language. . . . Somehow, in America, we have turned our language into something we hate."

In general, the trend is toward greater freedom for the student in shaping his study program.

The Arts

The same major state universities and land-grant colleges that annually graduate more than half of the nation's Ph.D.'s in agriculture, business and engineering also are making significant contributions to the fields of painting, sculpture, poetry, literature, theater, music, film, photography and dance.

Their viability in these areas is largely due to their willingness to experiment with new forms and concepts and to adapt their course offerings to the interests and talents of today's students.

Since 1964, Indiana University has granted more doctorate degrees in music than any other university in the United States. In addition, Indiana has the nation's largest student body majoring in musical arts. Uniquely combining the highest standards of academic study and the performing arts, the School of Music has a faculty of artist-scholars with international reputations.

In 1966, the University of Iowa established a Center for New Music. In addition to freeing promising young composers of financial worries by providing fellowships, the Center brings skilled performers to the campus for periods of a year or longer to present contemporary music to Midwest audiences.

Kansas State University students study methods of aquatic environment improvement.

Dance as an American art form now has an important ally in the state and land-grant university. Less than 50 years ago higher education and a dance career were considered utterly incompatible. Today, after half a

Sculpture class at University of Vermont

Shakespearean drama at University of Texas

century of experimentation with isolated dance courses, a number of public universities offer extensive programs to dance majors interested in concert performances, choreography and teaching.

The University of California at Los Angeles, which in 1964 opened the first separate dance department at any university in the nation, has a unique dance film archive preserving the visual records of the world's great dancing, past and present.

Universities also are emerging as proving grounds for opera. The University of California at Berkeley a few years ago staged Handel's opera "Semele," a work never before performed in its entirety in the United States.

Theaters on state and land-grant university campuses have developed to an extraordinary degree in the past decade. Where the campus theater once was the university stepchild, giving stilted Shakespearean productions to less than eager audiences, it is now the place where "things are happening." Scores of colleges have built drama centers which train students to a professional level in the writing, acting and production of high quality experimental and traditional plays, conduct theater workshops for community residents and expose local audiences to an astonishing variety of plays.

West Virginia University's new Creative Arts Center and several similar university centers strive to provide a total education in the arts through a balance between classroom work in the history, philosophy and theory of the arts on the one hand and creative expression and performance on the other.

In achieving a high standard of academic and artistic endeavor, the students and faculty of these centers also contribute to the cultural enrichment of local residents through an extensive program of concerts, stage productions and art exhibits.

Advanced Placement

Advance placement by examination is giving freshmen a head start on time and tuition fees at state universities and land-grant colleges. Entering freshmen who pass college-level examinations receive credits and, by eliminating certain introductory courses, gain more flexibility in choosing elective courses. They may be able to graduate in less than four years.

Advanced placement examinations have long been used in testing veterans and other adult students, but the testing of the majority of an entire entering class is a new trend.

The dean of admissions at the University of Utah, which leads the nation in credit hours awarded through the College-Level Examination Program (CLEP) of the College Entrance Examination Board, found that the program in just one year (1970-71) saved Utah students nearly $1 million in tuition and permitted 1,278 students to trim a full year off the time required to earn a degree.

"Many of the students now entering college are educationally and intellectually qualified for advanced courses," said the dean. "It would be grossly unfair not to credit their achievement and allow them to progress at their own optimum pace."

The University of California is exploring accelerated education by granting degrees entirely on the basis of competence shown in tests rather than the accumulation of credits by long course-sitting. Other acceleration techniques being developed at California and elsewhere are expanding credit-by-examination and advanced placement to all students, not just freshmen, and combining the senior year of high school with the freshman year of college.

In a further effort to speed up the educational process, some universities are offering a basic college education in three years, instead of four.

The State University of New York is developing such programs at several of its campuses. A group of carefully screened freshmen who have chosen their fields of specialization are eligible to earn the B.A. degree upon the satisfactory completion of 96 credit hours (typically 24 courses) instead of the traditional 124 credit hours (typically 31 courses). Special non-credit colloquia supplement the formal courses.

These time-shortened degree programs are testing the proposition that less time in college can produce curriculum reform and major cost savings while in no way reducing the quality of the education.

The Honor Student

A vexing problem for the large state university is how to provide a suitable education for the best (superior students) as well as for the many.

Honors programs for advanced students are among the answers. Rewarding hard work and good grades with even more challenge is the essence of these programs.

In 1955, one of the first college honors programs for lowerclassmen in a state university was launched at the University of Kansas. Soon, similar programs sprang up at other public institutions, and, in many cases, embrace the entire four years of undergraduate education.

There are various patterns for honors programs. Some universities have an honors college with its own faculty, curriculum, facilities and degrees. Others simply enroll students in an honors division in which they take some honors courses while pursuing individually selected undergraduate programs offered by existing colleges.

Honors courses offer the stimulation of studying in classes composed of students with similar abilities. Classes are generally smaller, more class time is spent in discussion and the emphasis in learning is on the why of things rather than the factual knowledge of names, dates and figures.

What the honors program tries to do, according to one honors division head, is to combine the atmosphere and advantages of a small college with the tremendously rich resources of a large university.

Grading Innovations

The evaluation of a student's performance by letter grades is frequently a source of controversy among teachers and students.

A pass-fail grading system now in use at many state and land-grant institutions is helping to eliminate some of the friction. The concept has been around for a long time but only recently has it become widespread at public universities as an option available to qualified students.

Pass-fail grading is designed to reduce academic pressures and competition while encouraging students to explore course work outside their major field without fear of jeopardizing their academic standing. Although there are many variations of pass-fail, freshmen, as a rule, are not eligible nor is the low-achieving student. There is also a limit on the number of pass-fail courses a student may take.

There are indications that pass-fail grading may, in turn, be replaced by a credit-no credit option with failing marks eliminated entirely or having no effect on the student's grade point average.

The Individual Student

Degree programs which allow students more flexibility in mapping out courses of study are growing in popularity at the state and land-grant universities. Two general patterns are emerging in these programs, most of which have been developed over the past three years.

The first approach might be described as a no-major degree. Students are asked to meet only a minimum of requirements and are given the freedom to work out a broadly based, well-rounded program of study without selecting any field of concentration. Generally, the only requirements imposed on the student pertain to the total number of credit hours to be taken, including a certain number in upper-division courses.

The second, and by far the most popular approach, also allows the student more freedom in designing his curriculum than is the case with traditional degree programs. However, the student has a field of concentration or major, often cutting across several disciplines, which he has devised to meet his unique needs.

In both types of programs, students work under close faculty supervision.

Degrees With No Majors

The Bachelor of General Studies degree program at the University of Michigan, which has been in existence since April, 1969, is probably the largest no-major degree program in operation at any American university. The 1971-72 enrollment in the program included approximately 900 freshmen and sophomores and 500 upperclassmen.

The new degree, offered as an alternative to the traditional Bachelor of Arts degree for many liberal arts students, eliminates language, distribution and concentration requirements. A study of the program, completed by a university professor in January, 1971, showed that the program attracted many independent and creative students who might otherwise have dropped out of school because of frustration with such requirements.

The University of Minnesota established a Bachelor of Elected Studies (B.E.S.) degree, which is very similar to the Michigan degree, in fall, 1971, within its College of Liberal Arts.

Encouraging student responsibility was the primary reason the college's curriculum committee cited for devising the program. The fact that 500 students enrolled in the program during its initial year seems ample evidence to the university that this is also what many students want.

Design-Your-Own-Degree Programs

The pioneer of the other type of general studies degree program among state universities and land-grant colleges is the University of Washington. Its General Studies Program has been in existence since the mid-1930's.

The university has awarded more than 1,250 general studies degrees since 1940, the first year for which records are available. In this program, the student plans his own course of study and academic major with the assistance of faculty advisers.

One of the least restrictive programs providing students with the freedom to seek education on their own is under way at the University of Oklahoma for students in the College of Liberal Studies. Classes are in the form of discussion groups which may come once a week or whenever the students want them. Students choose their books, each reading what he wants to learn about. Professors offer advice on what to read in place of regular assignments.

A student is tested about once a year, or earlier if he feels he is ready. The exam consists of tough, in-depth essay questions. If a student fails, he keeps studying and repeating the exam until he passes.

All student-oriented degree programs seem to catch on quite rapidly, once the concept has been established on campus.

The University of Alabama opened New College in fall, 1971. A first-year enrollment of 80 was expanded to 140— the school's maximum capacity—in fall, 1972. These students were chosen from 268 applicants.

External Degrees

Open universities, or "colleges without walls," represent further efforts on the part of today's educators to find new approaches to undergraduate education.

Informal classroom at University of Texas seeks to break down barriers between teacher and students.

Institutions of higher learning, forced to reexamine traditional assumptions about who should go to college and what the length and nature of the college experience ought to be, are experimenting with various programs offering degrees to students of any age who either cannot reside full time, or even part time, on a conventional campus or who, for reasons of their own, desire or need more flexibility in their educational programs.

In 1971, the State University of New York created Empire State College as a no-campus institution to provide students with an alternative to the traditional classroom experience. Empire State draws on the resources of the entire state university system to offer programs leading to a B.A. degree to students who may never see a traditional university campus.

An administrative staff located in upper New York directs various "learning centers" scattered through the state, which serve as convenience points where students periodically meet with faculty. Long-range plans call for the establishment of eight area learning centers and a maximum enrollment of 4,000 students.

A student may enroll any month of the year. He and a faculty "mentor" map a program of study suitable to the needs, talents and goals of the student, making sure that the program matches the academic standards of the state university system.

"Learning contracts" are agreed upon by instructor and student. Responsibility for fulfilling the contracts rests with the student. The community is the campus and source of study materials—research in local libraries and museums, interviews with experts in particular fields, sessions with a tutor and travel. (The college even provides a faculty mentor in London for students traveling abroad.)

Another experiment with external degree programs—University Without Walls—is being carried forward by a consortium of 18 institutions, including the Universities of Minnesota, Massachusetts and South Carolina. Started in 1971, the program provides students with highly individualized approaches to learning which require no fixed curriculum or time schedule for the completion of degree requirements. Consortium members are particularly interested in reaching the self-directed adult who has a clear idea of his educational goals.

In its program, the University of Minnesota does not use standard classroom instruction, credits or grades.

"We're getting away from the concept of education happening at a place where you go to learn. Education is something students do where they

are," says the coordinator of the Minnesota plan. "The emphasis here is on education as an on-going process which never ends."

Educators view the new external degree programs as possible solutions to the problems of overcrowded facilities and to the soaring costs of higher education. For a student living at home, the University Without Walls costs about half as much as an on-campus education.

The first American test of the innovative Open University Program, developed in England in 1969, was launched in 1972 by four public institutions—including three state universities. The British program allows students to study on their own with the aid of radio, tape cassettes, television and the printed word. A degree can be earned entirely in this manner.

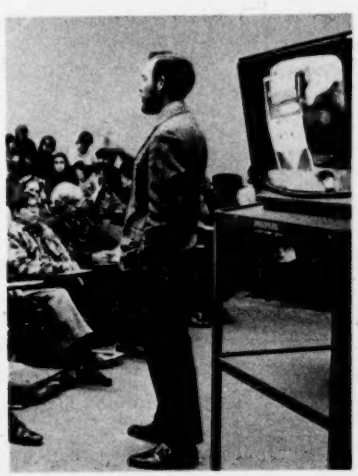
Institutions participating in the U. S. experiment are: Rutgers University, the University of Houston, the University of Maryland and California State College at San Diego. During the experiment each university offers two or three foundation courses for credit, in the areas of the humanities, science and mathematics.

One course in the Open University is the equivalent of several regular courses. For example, the humanities course offered by the University of Maryland will satisfy the minimum general education requirements in humanities, history and literature of Maryland's University College. Successful completion of a course in the Open University usually confers automatic admission to the college of the university in which such a course is ordinarily offered.

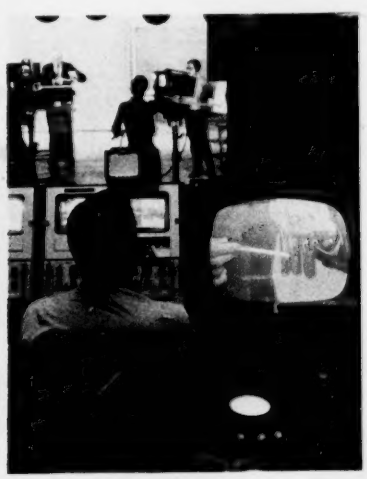
Independent study is supplemented with tutorial relationships between faculty and students. Participants may visit learning centers where they meet with their tutors. They will also have the opportunity to see and hear replays of material they have missed or wish to have repeated.

New Tools

The use of film, videotape recordings, computers, closed-circuit television and other technological tools is helping today's student learn more effectively and at his own pace.



Class at Clemson University utilizes video tape to supplement lecture.



(right) Professor at University of Connecticut lectures students via closed-circuit television.

Here are some examples of the technology of teaching at Ohio State University:

A prospective teacher and a dance student view their performances in the classroom and on stage via videotape recorder. Without leaving his dormitory, a student dons high-fidelity headphones, dials a number and hears a Japanese language exercise that his instructor assigned that morning.

From his auditorium seat, a chemistry student observes minute detail on a giant television screen as his instructor performs an experiment.

A mathematics instructor teaches a class at 8 a.m. before a video camera. Five times that day, other classes receive the same instruction via videotape recording.

Similar facilities and techniques are in use at other public universities. Educators insist that such tools do not dehumanize the classroom process but, in fact, give the students the benefit of the highest qualified faculty members with question-answer periods with less eminent instructors taking place in small groups immediately following the video lectures.

Problems of "Bigness"

The ever expanding size of some universities has caused many of them to be labeled "multiversities," conjuring images of students living lonely lives with little personal contact with faculty members or even with fellow students.

Some large state universities and land-grant institutions are taking productive steps to reduce the problems of bigness by providing a semblance of small college atmosphere on big college campuses. At a number of the larger state universities students with similar academic interests are housed in special residence halls called living-learning centers.

These centers contain dormitory rooms, study and classrooms (often equipped with modern, technological learning devices), faculty quarters and dining rooms. In such a center it is possible for a student to eat three meals a day with fellow students, attend classes, do lab work, visit informally with his professors, study in a library, play ping pong in the rec room, watch TV with friends, have a date in the grill room and end the day with a midnight bull session on his corridor—all without ever leaving his dormitory.

The "cluster college" offers another solution to the problem of bigness. Most of these small colleges have appeared on large university campuses in the aftermath of the student riots at the University of California at Berkeley in 1964. Student complaints that they often felt lost among the hordes on campus were considered to be one of the contributing factors leading to the Berkeley trouble. Other large universities saw the development of small residential colleges as one answer to this problem.

Perhaps the oldest college of this type in existence at a public university is Wayne State University's Monteith College, which opened its doors in September, 1959. Grants from the Ford Foundation made the establishment of the liberal arts experimental college possible. Students take only

University of California, Santa Cruz consists of number of separate "cluster" colleges.

about half of their classes at Monteith, scattering throughout the Liberal Arts College to take the rest of their courses. Classes within Monteith, which deal with the three broad areas in general education – the humanities, natural sciences and social sciences – are kept small.

Another example of this type of residential college was opened by Michigan State University in the mid-1960's. The University named its first residential college after Justin S. Morrill, father of the Land-Grant Act. The university now has three residential colleges, each centered on a specific area of study.

In 1965 the University of California at Santa Cruz began a unique experience in residential college education. The university opened its doors with a campus that consisted of one residential college. Since that time six more have been added. Eventually there may be as many as 20 colleges, varying in size from 400 to 800 undergraduates.

All students are members of a college, which includes living quarters, dining hall, common rooms, seminar and class rooms, a library, teacher offices and recreational facilities. However, students may attend courses given in other colleges.

Central facilities, including a university library and science laboratories, are available for the use of all students. Divisions exist to coordinate campus programs in various fields of study as well as graduate work. Education for the professions is also being provided through special schools.

Other ways in which large public universities have dealt with the problem of bigness include the establishment of "special floors" in dormitories for students with similar interests. Under this program, for example, foreign language majors develop close ties with students who share an interest in the same subject area.

Preparing Freshmen

A great many of the larger state and land-grant universities begin efforts to keep the individual student from getting lost in the crowd before he starts his freshman year. Faculty members and student representatives of these institutions visit high schools to respond to questions, and prospective freshmen, often with their parents, are invited to the campuses for orientation periods prior to the opening of the academic year.

The orientation frequently continues through the freshman year and includes extensive counseling and tutoring services. These special services are designed to help the student gain a feeling of individuality, however large the campus may be.

Graduate Education

While changes have been effected in undergraduate curricula, graduate education in the nation's principal state and land-grant universities also has been under searching study.

These institutions have joined with private universities in responding to the needs of students by restructuring courses, cropping superfluous offerings and gearing doctoral programs to four years instead of the average seven and one-half years it once took candidates in the social sciences and the humanities to earn their Ph.D.'s.

At the same time, the argument has been advanced by some, including Purdue's president emeritus Frederick L. Hovde, that, since graduate study programs pay such major dividends on the investment, they should be cut only with the very greatest care.

"Where do you want to curtail graduate study?" Hovde once asked in an address. "In medicine? Pharmacy? Veterinary medicine? Agriculture? Biological sciences? Pathology? Engineering? Physics? Nutrition? Should the quality of our local public school education be lowered by limiting graduate study for teachers?"

Hovde maintains that if there were no demand in American society—in the business and industrial world—for men and women with advanced degrees, graduate programs would come to an immediate halt.

The state and land-grant universities have been in the forefront of the endeavor to maintain and develop graduate centers for study and research. They have accepted their responsibility to train college and university teachers who have, in turn, trained other college, elementary and secondary school teachers. They have maintained the libraries and the laboratories for research and have trained other researchers.

The state and land-grant universities have also been leaders in training undergraduates who have gone on to earn doctorates. Topping the list for a 50-year period in this category were: University of California at Berkeley, City College of the City University of New York, the Universities of Illinois, Wisconsin, Michigan, Minnesota, Cornell University, Massachusetts Institute of Technology, the University of California at Los Angeles, Ohio State University, Brooklyn College of the City University of New York, University of Texas, Pennsylvania State University and the University of Washington.

Law and Medicine

State and land-grant universities are among the leaders in training both doctors and lawyers.

The total enrollment of law degree candidates at approved American Bar Association law schools as of the beginning of 1972 was 103,382. Of this total, 38,884, or 37.2 percent, were enrolled at institutions holding membership in the National Association of State Universities and Land-Grant Colleges.

Pediatric surgeon conducts demonstration for University of Virginia medicol class.

In the vital area of medicine, state and land-grant universities enrolled 23,914 students in their medical schools in 1971-1972—55.1 percent of the total medical school enrollment of 43,399 in the entire United States.

Medical schools at state and land-grant universities are responding in a variety of ways to the crisis in medical education in this country. From increasing enrollments to shortening the period of training and making substantive curriculum changes, these institutions are showing their concern, not only about producing more doctors, but also about maintaining and improving the quality of the medical education students receive.

Increases in enrollments of entering classes, ranging from 10 to 67 percent, are being made by some of these medical schools. The University of Colorado, for example, increased the enrollment of entering medical students nearly 50 percent between 1967 and 1970. The number of first-year medical students at Michigan State University increased 65 percent between 1970 and 1971. Indiana University, which already boasted the largest medical school in the country, forecast in 1967 a 50 percent increase in enrollment of new medical students by fall, 1973. Other institutions planning substantial medical student increases are the Universities of Kansas, Iowa, Missouri and Vermont.

Elsewhere, universities have recently opened new medical schools. During 1971, at least four new medical facilities were opened by state or land-grant institutions. The University of Hawaii and the University of Missouri-Kansas City started operation of their medical schools. The University of Nevada began its School of Medical Sciences which provides a two-year curriculum to prepare students for entry at the third-year level at medical schools in other states. Michigan State University opened the first university-based osteopathic medical school.

Time-shortened programs of medical study also are aimed at increasing the number of practicing physicians. Although most shortened programs have been developed within the past few years, the University of Tennessee pioneered this concept in 1930 when it began year-round operation at its Medical Center in Memphis. It took 39 months to complete the curriculum. In 1963, the time required to complete the program was decreased to 36 months with some minor tightening of the curriculum.

The University of Alabama recently decreased its medical school program to three years by instituting year-round operations, providing greater clinical training and allowing students to develop programs tailored to their individual needs. At the University of Kansas, the required basic science curriculum has been shortened and vacation periods have been eliminated to allow students to finish their training in three years instead of four. The University of Texas now offers medical students a choice of either a three-year or four-year program.

Joint Medical Programs

Cooperative programs may prove to be relatively inexpensive ways of providing quality medical education for an increasing number of students. A typical program allows medical students to take their first year, and sometimes the second year, of medical school at a regular university and then transfer to the medical school for the final years with concentration on clinical practice rather than classroom study.

Clemson University and the University of South Carolina have started a joint program with the Medical University of South Carolina which will permit selected students to complete both B.S. and M.D. degrees in a five-year period of year-round study.

Indiana University sponsors the Indiana Statewide Medical Education System. Freshman medical students spend one year (and sometimes two years) at the campus of one of five cooperating schools before transferring to the Medical School of Indiana University. Florida A&M University and Florida State University offer preclinical medical training for first-year medical students, who transfer to the University of Florida Medical School for subsequent training.

University of Washington first-year medical students can take up to one year of initial training at cooperating schools in Alaska, Montana and Idaho, states which do not have their own medical schools. The basic curriculum is completed at the University of Washington but clinical work may be taken in any one of the participating states.

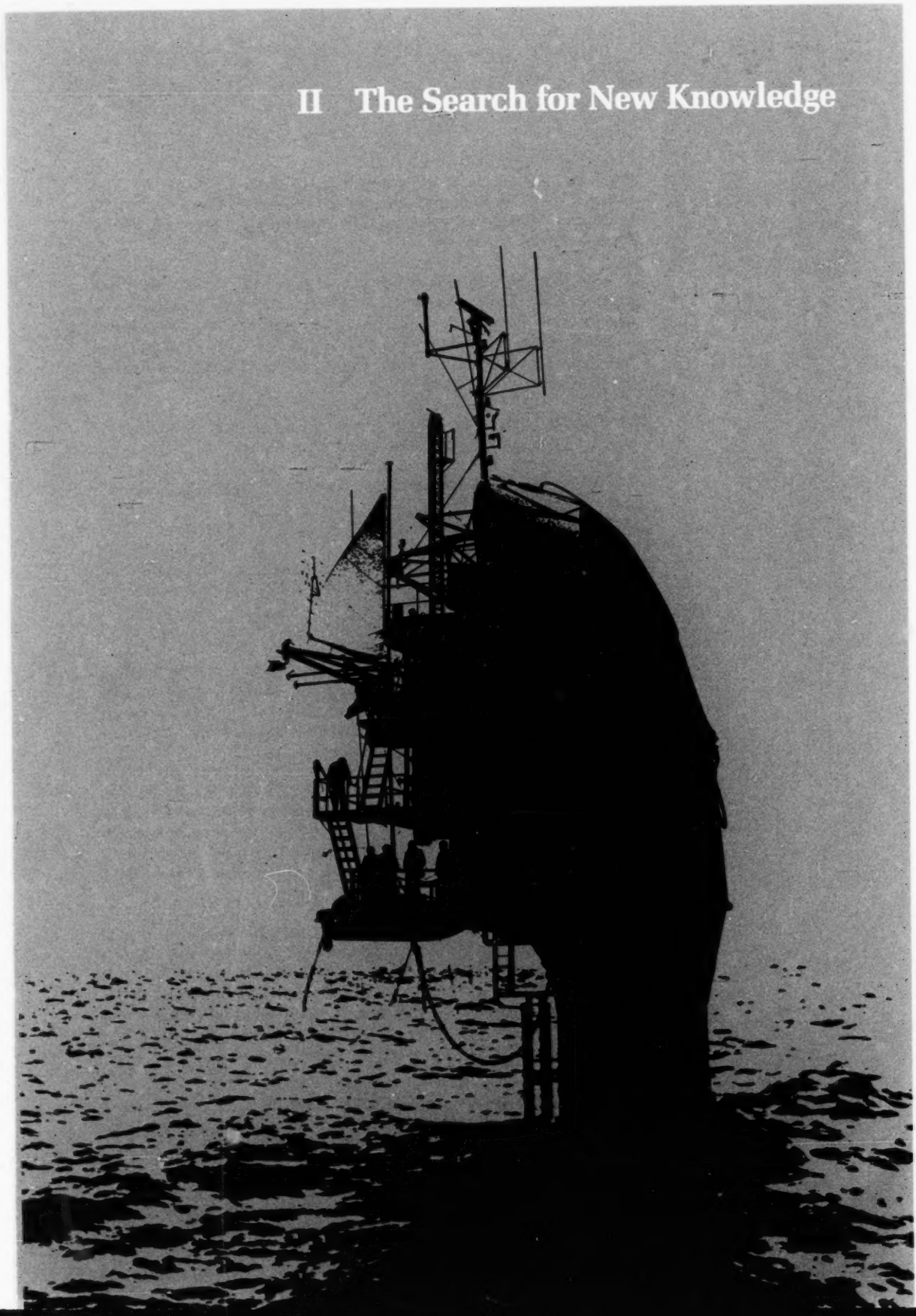
Family Physicians

One of the major curriculum changes in recent years has been an increased emphasis on the training of family physicians. Students generally work directly with a practicing doctor in a community. The University of California, San Diego, Michigan State University and the University of Minnesota are among the schools which offer this type of program.

Clinical practice in a community hospital is another means of training the family doctor. The University of North Carolina, Chapel Hill and Indiana University are among institutions which have programs of this nature.

Training in a community setting, either in a hospital or with an individual physician, offers one solution to some of the problems of medical education and care in the country. By using other available facilities for portions of training, the overstrained central teaching facilities can enroll more students. At the same time, student assistance helps alleviate medical manpower shortages in rural areas and small towns.

II The Search for New Knowledge



University of Illinois early laboratory

The Search for New Knowledge

Research—the search for new knowledge—is at the center of any great university. Without a vigorously pursued program of research it would be impossible for the university to fulfill adequately its other two functions of teaching and public service.

A large share of criticism of the role of universities, particularly the publicly-accountable ones, has zeroed in on research, which is said to take the professor away from the classroom and from direct involvement with the surrounding community and isolate him in a lab working on some obscure project of dubious value to either university students or the state and nation as a whole.

Yet research goals of these institutions remain relatively simple and, as stated, tend to refute voiced objections. The goals are:

1. To enhance student education on both the undergraduate and graduate levels.
2. To further the progress and welfare of the state and nation.

Goals, however, are just that—the end toward which effort is directed. The crucial question, therefore, is whether public universities reach or fall short of their stated objectives.

Research and Teaching

As a part of student education, research provides the raw material for textbooks and the constantly changing and expanding data base upon which the teacher must depend in keeping his course presentations up-to-date. In sum, research makes a dynamic and relevant curriculum possible.

Research is also often used as a mode of learning by the effective teacher who wishes to imbue his students with qualities that will result in a life-long pursuit of new knowledge. Such student-conducted research is being carried out at every level at the state and land-grant universities—from the undergraduate to the Ph.D., where research has always been a major part of degree requirements.

A former president of the Massachusetts Institute of Technology summed up the importance of research as part of teaching in this way: "By its very nature research demands originality in thought and action; and it is in research that the student as well as the faculty can find an outlet for creative interest and energy and share in the intellectual excitement of new discoveries."

National Contributions

There is probably no person in this nation whose life has not been touched in some way by a research accomplishment of a state or land-grant university. Here is just a sampling of ways research has affected modern American life:

• The wonder drugs streptomycin and neomycin, which have helped save literally thousands of lives, were developed at Rutgers University.

• The first sound-on-film motion pictures were developed at the University of Illinois. Early research in television transmission was carried out at Purdue University.

• A simple and effective heat sterilization technique for canned foods was developed by Dr. Karl F. Meyer of the University of California's Hooper Foundation. The discovery virtually eliminated the threat of botulism, the deadliest form of food poisoning, and gave birth to the modern American canning industry with its annual dollar volume of over $5 billion.

• Dr. William Dock of the University of Michigan, while involved in research during the first part of the century, was the first to recognize heart attacks. Pioneer work in the development of the electrocardiograph, used in diagnosing abnormalities of heart action, was also done at that institution.

• When America's first satellite soared into space, the first communication this country received from outer space came from miniature instruments designed and built under the direction of Dr. James Van Allen of the University of Iowa. This is only one of literally thousands of contributions made to the nation's space program by large public universities.

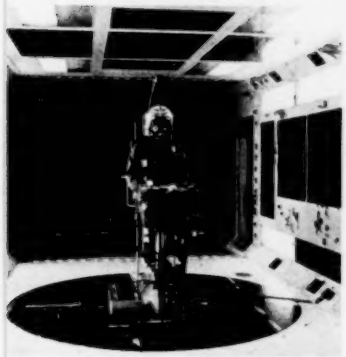
The cumulative benefits of state and land-grant university research has more than repaid the public for tax dollars spent in support of these institutions since the beginning. The scope of research carried on by these institutions makes their contributions to society virtually impossible to measure.

Scientific Revolution

The area of research where results have been most visible and most applauded by all of society is science. It has been estimated that almost half of the basic scientific discoveries made in this country have come from the laboratories of American colleges and universities. A significant portion of these are attributable to state and land-grant university research.

One of the best examples of the effect that this basic research has made on the nation can be found in the invention of the cyclotron (the original practical atom smasher) by Ernest O. Lawrence at the University of California. This, according to Dr. Glenn Seaborg, former chairman of the

Atomic Energy Commission and later a chemistry professor on the Berkeley campus, put the university "into the center of fundamental research in nuclear physics—a field that seemed to be an abstruse science for an intellectual elite. But this opened a veritable Pandora's box of practical results."



Wind tunnel at University of Maryland is used for medical and aeronautical testing.

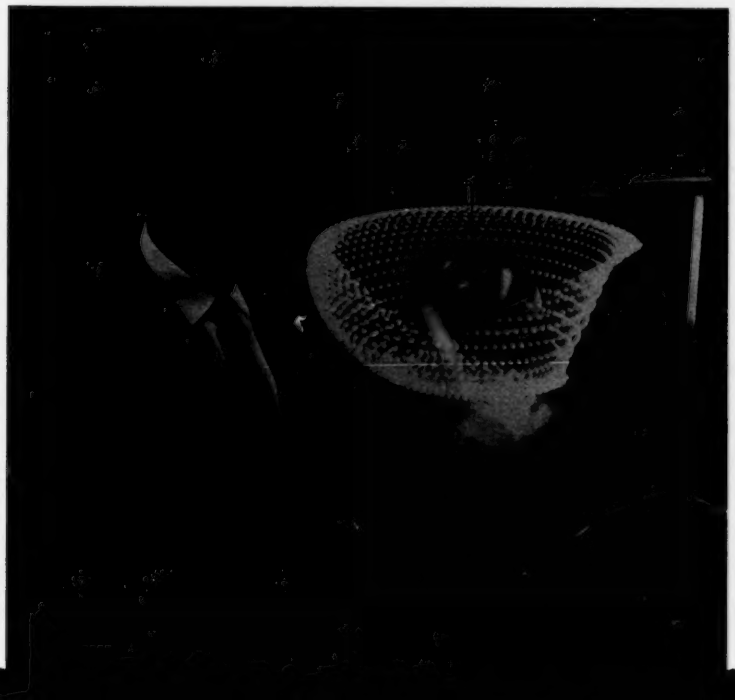
Among the results cited by Dr. Seaborg was the discovery of numerous radioactive isotopes which have made tremendous contributions to biology and medicine and the discovery of breeder reactors which assure mankind of energy supplies for hundreds or even thousands of years.

"It has been estimated that the monetary value of nuclear fuels in terms of energy equivalent . . . runs into quadrillions of dollars," said Dr. Seaborg.

Isotopes, in addition to their use in the diagnosis and treatment of disease in the United States to the extent of eight million applications per year, are used in about 1,000 American industries to increase efficiency and safety of operations, with savings that have been estimated at hundreds of millions of dollars per year.

The new University of Wisconsin Biotron offers another example of the value of scientific research in solving a galaxy of world problems. The Biotron is a variety of climatically controlled rooms, each of which can provide special conditions for the study of animals and plants. Temperature, humidity and light conditions occurring almost anywhere on the surface of the earth can be duplicated. In use since 1967, the Biotron has a versatility which has been domonstrated in investigations ranging from the causes of Asian flu epidemics to safe methods for curing sausage.

Prior to World War II, most university scientific research concerned itself primarily with the study of basic physical phenomena. However, within the past 25-30 years a new emphasis on research applied to the practical problems of environmental pollution, national defense, space exploration, industrial expansion, medicine and the general improvement of



the standard of living has evolved. A direct look at some of these problems will show the part the nation's major state universities and land-grant colleges and universities are playing through research in finding answers that benefit all mankind.

A Dirty World

Studies aimed at cleaning up the environment were being conducted by state and land-grant universities long before the nation as a whole was aware of the proportions of the ecological crisis.

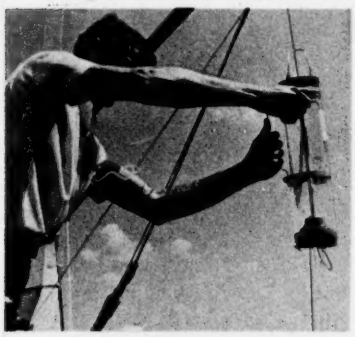
Rutgers University pioneered in the development of an interdisciplinary organization to deal with environmental problems in 1920. It grew out of an investigation by a Rutgers entomologist back in 1917 of a fly infestation in the trickling filters of the Plainfield Joint Meeting Sewage Treatment Plant. His recognition that the nuisance of the flies was only a small part of the water pollution problem which the plant represented led to the creation by the State Legislature of a Rutgers study team. Over time this became the university's current multi-faceted Department of Environmental Sciences in the College of Agriculture and Environmental Sciences.

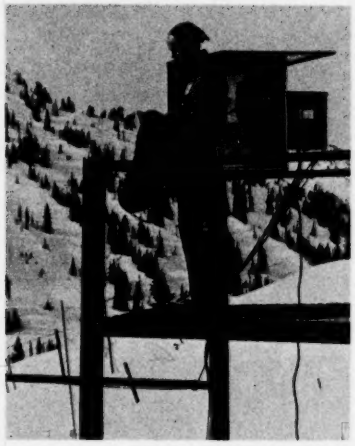
The department now has a solid technical program in the areas of water resources, waste water and treatment, stream pollution, water chemistry, microbiology of water and waste water, aquatic biology, air pollution and atmospheric chemistry, radiation and radiological health, solids waste management and environmental health. This is typical of the variety of ecological research underway at most state and land-grant universities.

The problems of the environment offer one of the best examples of the interdisciplinary approach that much research must take. A study at Kansas State University in September, 1971 turned up more than 200 staff members involved in different types of pollution research and experimentation. Scientists involved represented areas as diversified as biology, home economics, history, geology, agriculture and mechanical engineering.

Other state and land-grant universities that have taken stock of the totality of research programs concerned with environmental restoration and preservation have come up with equally dramatic statistics. The University of Wisconsin at Madison reports that it spent over ten million

University of Connecticut researcher studies water pollution.





High mountain weather study is carried out by University of Utah scientists.

dollars in environmentally-oriented research in 1970-71. This included work by the university's Institute for Environmental Studies along with projects underway in more than 20 departments and 15 centers across the campus. Major programs are being conducted in the schools of Engineering, Medicine, Law, Education, Agricultural and Life Sciences and Letters and Sciences.

The Institute itself is typical of the growing trend among state and land-grant universities to provide an integrative effort in the area of environmental studies. It functions as a teaching, research and public education unit. In addition to offering more than 30 courses each semester, the Institute conducts scores of research projects through five centers and two groups. These include: Center for Geographic Analysis, Human Systems Center, Center for Biotic Systems, Center for Climatic Research, Marine Studies Center, Quantitative Ecosystem Modeling Group and Environmental Monitoring and Data Acquisition Group.

Pennsylvania State University, another land-grant institution with a widely ranging program of environmental research, was awarded a Rockefeller Foundation grant of $750,000 in 1971 for the purpose of strengthening its programs in environmental quality. The grant, one of the largest of its kind ever received by Penn State, enabled the university to establish an Office of Environmental Quality Programs and to initiate a number of multidisciplinary research and education programs.

Illustrating the diversity of research underway at just one institution, Penn State programs that have recently attracted national attention include:

- The establishment of a Noise Control Laboratory within the College of Engineering. The facility will be available for use in all acoustics-related programs. Research on jet noise, acoustically absorptive treatment of fan ducts and on industrial and transportation noise are also underway on this campus.

- Research on ladybird beetles, among the first "discoveries" in a nationwide search for natural predators to control insects. This was conducted by Penn State entomologists in the Fruit Research Laboratory of the Agricultural Experiment Station.

- The identification of plants that have a capacity to suck problem-causing elements and nutrients right out of dying lakes. Two Penn State scientists undertook this project.

- The Living Filter, which is on display at the University Park campus as a waste water recycling technique. The university has carried on research for more than a decade designed to determine if impurities in waste water can be completely "filtered out" by the soil and at the same time be used to nourish crops and develop green cover on barren lands.

There is no type of known pollution that is not under attack by state and land-grant universities. For example, practically every university is studying rivers and other natural bodies of water located within its state boundaries for answers to pollution problems.

Michigan State University has a total fund of $1.7 million for the Campus Water Plan, a research-teaching-demonstration program in wastewater

recycling. Approximately 500 acres of the main campus have been allocated to the project. The recycling plan can eventually be adapted for use on a national scale.

Air pollution research is equally extensive, ranging from ways to measure it through means of eliminating it. Project Clean Air at the University of California offers an illustration of the broadly-based study being carried out in this area. In 1970, the university started this program of mission-oriented, managed research at the suggestion of university faculty. It is a part of the institution's comprehensive Statewide Air Pollution Research Center, which has been in operation since 1961.

The idea was to provide control agencies, including the California Air Resources Board as well as local agencies, with information that would be applicable to air pollution control. University task forces worked out proposals for programs with both short- and long-term goals in a number of areas including propulsion systems, health effects of air pollution, sociological chemistry, physics, meteorology, power industries, agriculture and total ecology simulation modeling with computers.

Task force proposals were presented to the state legislature, which allocated an initial $750,000 in funds to the undertaking through the state air resources board. Subsequent appropriations have continued the research, which includes more than 20 separate projects underway on various campuses of the university. The Project Clean Air office serves as a coordinating body in developing proposals for research to be carried out under the auspices of the state board.

Although air and water pollution research probably constitute the two major types of environmental study, they by no means represent the total range of investigation underway. Ecological studies of deserts and grasslands, the disposal of solid wastes, the use of pesticides, the problems created by excessive noise, even the part pollution plays in producing chronic high irritability in man also are types of research which are attempting to make this nation a better place ecologically.

A Cure for Disease

Not so long ago, summers in the United States were deadly times. That was the time of year when polio attacks were most likely to occur. As late as the early 1950's the disease was claiming 57,000 victims annually.

Then in 1954 Dr. Jonas Salk, a research scientist at the University of Pittsburgh, perfected his now famous vaccine which has virtually eliminated this tragic crippler.

This is only one of the countless contributions to the eradication of human suffering that can be linked to a major state or land-grant university. Some others include:

- The pioneering work of Alfred C. Kinsey in the field of human sexual behavior at Indiana University, which served to break down barriers to study of this important area of man's behavior.

- The development of the anti-coagulants Dicumarol and Warfarin for use against blood clots at the University of Wisconsin.

• Discovery of the tools to aid in the identification and sorting out of human chromosomes at the University of Texas.

• The first complete laboratory synthesis of a gene at the University of Wisconsin and of the human growth hormone at the University of California.

These make up only a sampling of medical breakthroughs that could be cited and do not begin to tell the story of continuing research that may some day produce a cure for cancer, heart disease, sickle cell anemia, genetic disorders . . . .

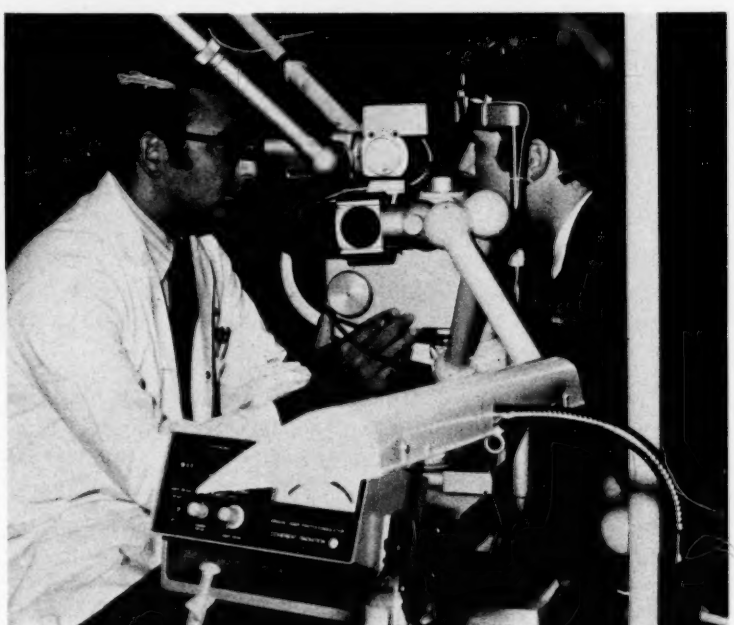
The search for a cure to cancer provides a good illustration of the variety and extensiveness of study underway to alleviate human suffering. There have been a number of breakthroughs creditable to state and land-grant university research within the past few years in the continuing search for better means of treatment of this killer, which claimed an estimated 339,000 American lives in 1971. For example:

The first isolation of a human cancer virus was accomplished by a medical team at the University of Texas' M.D. Anderson Hospital and Tumor Institute. The team then succeeded in growing the virus in human lymph cells in the laboratory. This could open the way to learning causes and possible prevention techniques of many cancers.

A rapid, safe and accurate method of diagnosing lung tumors—long one of the most frustrating problems in medicine—was developed at the University of Iowa Hospital. In a series of 75 patients tested there, the new procedure brought a ten percent increase in the accuracy of diagnosing lung cancer.

A University of Wisconsin scientist, associated with the university's McArdle Laboratory for Cancer Research, proved that some cancer viruses transfer genetic information by a reverse process. This contradicted the traditional theory that the transfer was strictly a one-way process and is of prime importance in continuing cancer research.

Scientists at University of California, San Diego School of Medicine use computer analyses to study brain waves.



Laser instrument in use at University of Illinois Medical Center can prevent blinding side-effects of diabetes and sickle-cell anemia.

Two Ohio State University professors reported the effective use of the drug L-Dopa in relieving the bone pain in a portion of patients with advanced breast cancer.

Findings which offer the hope of eventually stimulating the human defense mechanisms to fight cancer have been reported by a University of Minnesota scientist.

A test which may reduce from five years to one month the time required to determine the success or failure of a cancer patient's surgery has been developed by scientists at the University of Tennessee. The test will alert physicians to begin immediate treatment of surgical patients whose cancer has not been eliminated, possibly saving their lives.

A close look at research in any other field of medicine would reveal equally extensive and fruitful activity, for the fight against disease is a major focus of state and land-grant university study.

Research for Defense

The societal benefits of medical and most scientific research are easy to document. However, in at least one area, universities have faced growing criticism that has caused them to re-evaluate research policies. This in in the area of defense research, much of which has been of a classified nature.

The controversy reached its most tragic manifestation in August, 1970 when a bomb smashed the University of Wisconsin's Mathematics Research Center, killing one person. The university had already been trying to play down on-campus defense-funded research by dropping the words "U.S. Army" from the center's name. However, the Army had been financing work there at the rate of about $1-million a year. And Wisconsin was far from alone in the size of its commitment to such research.

As an aftermath of the Wisconsin tragedy, there has been a re-thinking of official policies regarding defense-sponsored and classified research on most campuses. At least one public university has gone so far as to forbid classified research completely. A new Research Policy adopted by Wayne State University in October, 1970 guaranteed the right of individual investigators to select the subject matter of their research so long as it was in compliance with general university policy. It then barred all classified research as part of university policy.

The University of Michigan revised its policies governing classified research, applying restrictions to three types of research:

1. Research which "limits open publication of the results of research beyond approximately one year."

2. Research which restricts the publication of information about research sponsors or "the purpose and scope of the proposed research."

3. "Research, the clearly foreseeable and probable result of which, the direct application of which, or any specific purpose of which is to destroy human life or to incapacitate human beings."

The university also transferred its Willow Run Laboratories—the site of most classified research—along with all contracts to be conducted there to a private non-profit corporation.

Massachusetts Institute of Technology turned its former Instrumentation Laboratory into the completely independent Charles Stark Draper Laboratory after several years of controversy concerning its operation. The university, however, continues to allow its graduate students and faculty to work at Draper on defense research projects on their own time.

Other university policies regarding classified or sponsored research have established rules similar to those governing University of Michigan research.

One aspect of such new policies continues to trouble the academic community. This concern was summed up by the University of Michigan Board of Regents in announcing that institution's revised policy.

"In an ideal university existing in an ideal world, all scholars would be free to select their own spheres of inquiry and there would be no restrictions imposed, either externally or internally, on their freedom to publish or otherwise disseminate the fruits of such scholarly activities," the statement noted.

"But for the university existing in contemporary society, the matter of classified research poses a choice between two limiting alternatives.

"If the university elects to participate in classified research, the principles of free discussion and full dissemination must be compromised. If it elects not to participate, the full freedom of scholars to select areas of investigation of their own choice is potentially denied to some."

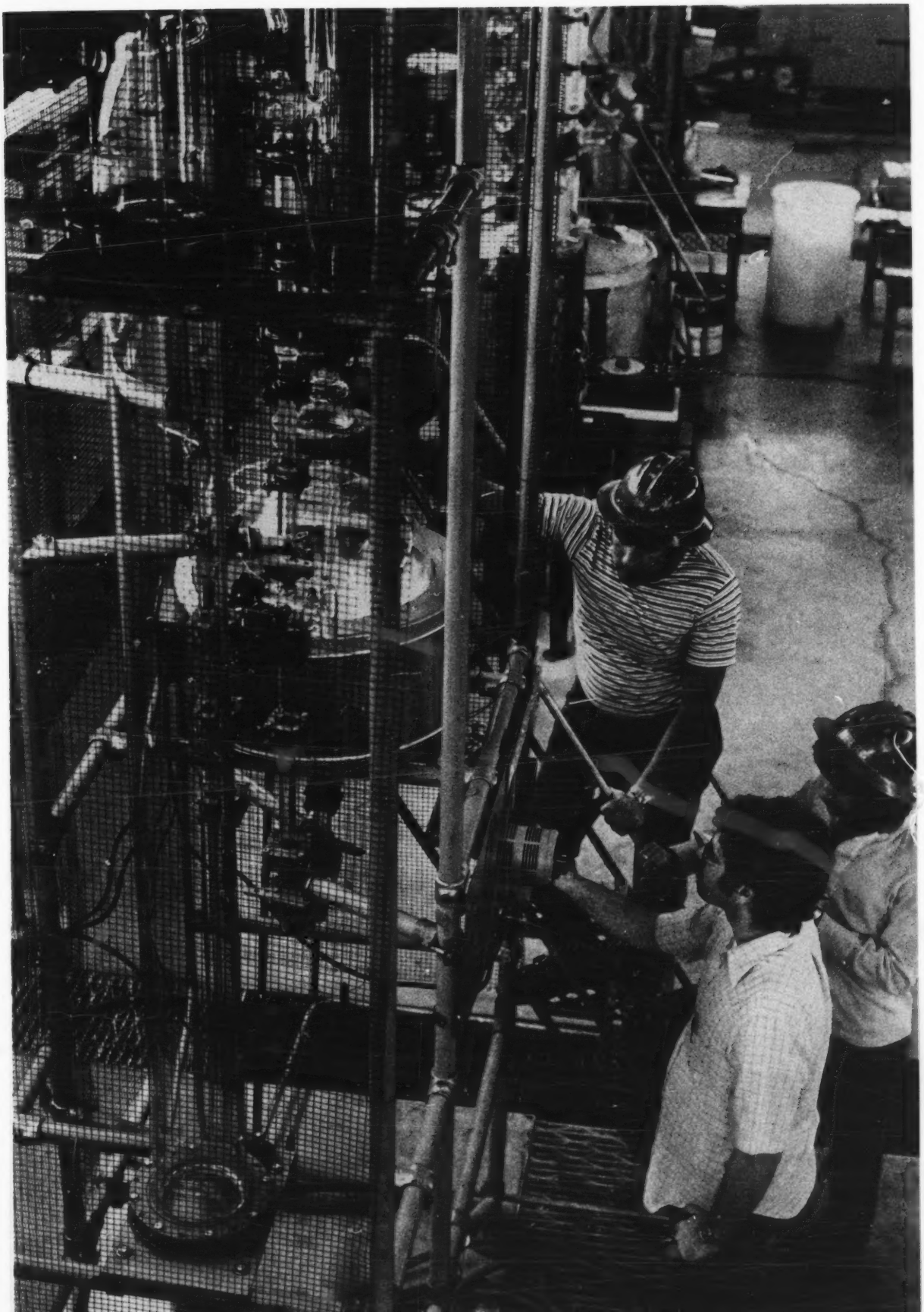
Partners to Industry

Through the years, practical results of university research have often been of vast benefit to industry. So valuable has this association been that in many instances industries have developed "cooperative" programs with universities for research designated to help them operate more efficiently, produce an improved product or serve the consumer better.

This mutually helpful relationship has not always existed. In the earliest days, before national problems demanded the joint enterprise of universities and private industries, the two tended to go their separate ways. Industries were carrying out massive research efforts to come up with discoveries which meant private profit and could be patented for exclusive use. However, at the same time, universities began to move haltingly toward productive research in engineering fields.

In 1903 the University of Illinois became the first land-grant institution to organize a separate and distinct Engineering Experiment Station. It was established "in recognition of the need for more accurate knowledge of the materials and processes of engineering and the conservation of those resources upon which engineering industries depend."

By 1930 more than 25 engineering experiment stations had been established but, in an Office of Education study issued that year, it was estimated that "fewer than ten of the land-grant college engineering experiment stations are receiving support from any source sufficient to develop research in engineering."



Despite meager funds and inadequate equipment, some progress was made. The universities and industries began to work together as each became aware of the contributions the other could make. Contact with industry led to increasingly large sums donated for teaching, extension and for equipment that would not have been obtainable otherwise. Industries profited from standardized tests developed for such things as sewer pipes, drain tiles and culvert design and from new types of utilization as well as disposal of industrial wastes. University research and tests also led to such things as the modern carburetor, lessening the smoke nuisance, reducing domestic heating to a science and placing farm electrification on a rational basis.

Engineering students at University of California, Berkeley, work on design of smogless car.

The real turning point in the relationship of industrial-university research, however, came with World War II. The value of university research was demonstrated in the closing years of the war when research in such important industrial fields as aeronautics, electronics, metallurgy, ordnance and power was started. There was a boom in support from industry.

To guide universities in the management of industrial research, Dr. James R. Killian, Jr., then president of the Massachusetts Institute of Technology, suggested three principles that are still followed by institutions today:

1. The primary purposes of an educational institution are to educate men and women and to increase knowledge, not to compete with industry in industrial or development research.

2. Sponsored industrial research should be closely related to the normal program and recognized objectives of the institution.

3. Imposition of restrictions on publication of research results, either for secrecy or patent reasons, can become incompatible with the basic concept of an educational institution as a source and distributor of knowledge.

Operating with these precepts in mind, universities have been able to make contributions to industry that have boosted the economy of the states they serve many times over. At the same time, mutual cooperation has given students an opportunity to learn by studying the actual problems that industries face and provided industries with a vast storehouse of specialized knowledge.

Within the past ten years several university industrial parks have been developed by state and land-grant universities as unique demonstrations of the value of university-industry alliances.

In the early 1960's North Carolina State University, Duke University (private) and the University of North Carolina at Chapel Hill joined forces in the organization of Research Triangle Park. The park, which was conceived as a means of bringing about economic advancement within the state, includes 18 industrial, governmental and university affiliated research units with more than 8,000 employees. Several hundred professors from the three participating institutions carry on consulting work at the park and industrial researchers frequently serve as adjunct professors at the universities. In addition, students get regular exposure to the industrial labs at the park—which is located at approximately the same distance from each of the universities, all of which are within a 15-mile radius.

Archeology students at University of Iowa study remains of prehistoric Indian fortress.

The University of Utah has undertaken a program to develop a similar research park. A number of companies have set up operations in park facilities and others plan to do so.

Industrial research activities actually began on this campus in 1953 when the Kennecott Copper Corporation built a research laboratory near the College of Mines and Mineral Industries. The research park, located on more than 300 acres of university land, will simply bring together a number of industries and federal agencies that have worked in cooperation with the university for years.

Through engineering experiment stations, industrial parks and other engineering research departments and divisions, state and land-grant universities have been able to contribute to virtually every field requiring engineering expertise.

The bad effects of industry can at times be eradicated by university research. At Ohio State University a team of scientists from the College of Mathematics and Physical Sciences and the College of Veterinary Medicine is conducting black lung research. Researchers are studying the lungs of mine ponies which have contracted the disease with the hope of correlating the effect of coal dust on the ponies' lungs with the similar disease in man.

In another effort to cut down on problems caused by industry, a task force from Clemson University got the backing of a major national textile concern in its efforts to solve one of the textile industry's biggest foes: Water pollution. J. P. Stevens & Company funded a two-and-a-half year project aimed at developing a system that combines new waste treatment processes to make the effluent from the company's plant on Lake Hartwell in Oconee County compatible with the federal water quality standards.

One of the most unique examples of cooperation between industry and university research, with seemingly divergent goals, is offered by the University of South Carolina. The university's Institute of Archeology

and Anthropology has excavated on the Broad River north of Columbia with funds provided by the South Carolina Electric and Gas Company. The work was carried forward in an area where the company planned ground changes in connection with development of a power plant and reservoir. The cooperative project prevented destruction of remains of prehistoric peoples.

Medical Engineering

Medical science is often aided by engineering research. Medical engineering is one of the most rapidly growing, yet relatively unknown, fields of engineering.

To obtain tissue specimens from living tumors, University of Iowa technicians in 1972 developed a "mobile" plastic catheter with a controllable tip which is faster and easier to use then the old rigid polythylene catheter.

Clemson University engineers have developed a carbon dioxide gun which fires a high velocity stream of dry ice particles to be used for treating serious burns and in surgical procedures.

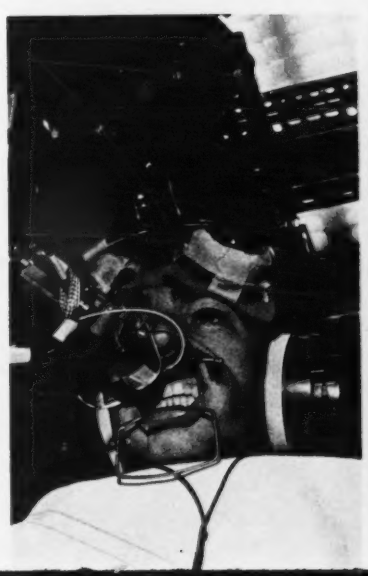
Georgia Institute of Techology investigators have tested a micro-miniature device that measures pressure and sound when inserted by catheter directly into the human heart. They also are investigating techniques for using microwave energy for the more successful thawing of frozen organs. The university's nuclear reactor has been used to make available a radiosotope of fluorine-18 for early cancer detection.

The University of Wisconsin's Bioengineering Center is coordinating a number of significant research projects in the field of medical engineering.

These projects include the development of a blood pump-oxygenator system for the assistance of diseased or congested lungs of a child and the modeling by computer of the human walking process aimed at the construction of powered prosthetic and orthopedic lower limbs.

A research program in theoretical neurophysiology involves the study of ways in which information from the outside world is sent to the mammalian brain by various sense organs.

Dental research underway at Ohio State University



(right) Splinting device designed at University of North Dakota

Indiana University researcher conducts study of aging process.

Research for People

The tangible results of scientific research have brought the work of state and land-grant universities to the attention of the entire nation. The less concrete findings that have come about through research in areas encompassed by the social sciences have not been as visible or as applauded. Nevertheless, the collective contributions in this area are of great importance to people in their daily lives.

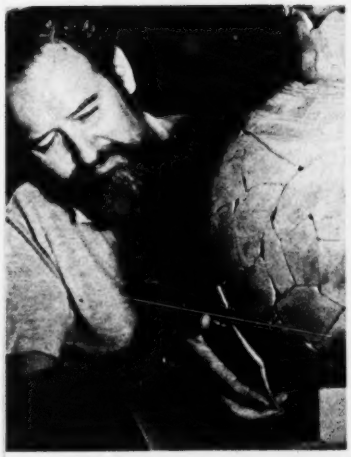
Pioneering work in the area of social science research was done by the University of Michigan's Institute for Social Research (ISR). The institute was founded by Dr. Rensis Likert and Dr. Angus Campbell in 1946. The two men were among a small group of sociologists and psychologists who worked in Washington during World War II, developing sampling techniques and survey methods.

After the war the two scientists sought a receptive environment to continue development of this new tool of social science. The hoped-for invitation came from the University of Michigan.

The institute is a research organization which is basically concerned with providing the kinds of national and local data that are needed for informed social decisions. The institute has four units: the Survey Research Center, the Research Center for Group Dynamics, the Center for Research on the Utilization of Scientific Knowledge and the Center for Political Studies. The ISR professional staff of 75 represents the spectrum of social science, supplemented by representatives from such fields as mathematics, epidemiology, social work, education, journalism, medicine, public health and psychiatry.

The institute's early efforts in the development of techniques of data acquisition and assessment have found wide acceptance. In 1971 ISR received a three-year grant of $3.1 million from the National Science Foundation for use in strengthening its existing national sampling operation, improving methodology and technology and providing better access to data.

"For over 20 years the Institute has been monitoring the economic and political attitudes and behavior of the American people. It is now launching a broader program of measures of life experience," explained Dr. Campbell. "We no longer believe that national well-being can be adequately measured by the gross national product. We need to know a great deal more than we know now about the social changes that are going on in this country and the impact these changes are having on the lives of our citizens."



University of Hawaii professor repairs artifact discovered in Thailand.

The relevance of study in areas pertaining to the relationship of man to his world is also being demonstrated by the new Academy for Contemporary Problems founded jointly by Ohio State University and Battelle Memorial Institute. The academy has as its purpose: " . . . to encourage a combination of advanced study and education for problem definition and solving on topics relevant to contemporary challenges of man; to promote provocative and mutually beneficial communication of ideas and information between members of the academy and the community regarding important public problems; to serve mankind through application of knowledge, and provide advanced training and public service."

The interdisciplinary approach that so often must be brought to bear when studying complex social issues is also illustrated by a program at the University of Minnesota. The university received a grant from the National Science Foundation for a pioneering study of social problems by a faculty team from the diverse fields of engineering, social sciences and mathematics. Administrative direction for the project comes from the university's Center for Comparative Studies in Technological Development and Social Change.

The purpose of the research is to provide a firm theoretical foundation for implementing plans to achieve social objectives. Social scientists at the university have noted that there is no reliable knowledge on which to base practical efforts for reaching many social goals. The researchers see the project as a start toward building a formal theory for setting social goals in a democratic fashion and a guide for designing the decision-making agencies or operations needed to achieve the goals efficiently.

A new Bureau of Government Research begun in 1971 by the Lyndon B. Johnson School of Public Affairs at the University of Texas is illustrative of another developing trend in social science research. Its goals include:

To provide to Texas state and local governments an analytical research capability for dealing with problems and capitalizing on opportunities.

To provide an expanded program of continuing education for public officials and employees and for citizen groups dealing with critical public issues.

The new unit is an attempt to fill what the school's dean, John A. Gronouski, described as "a dearth of research capability at the state and local government levels." The bureau's studies are designed to be "user-oriented," such as working with a city to develop a property tax assessment system or evaluating the effectiveness of state-administered programs.

A similar undertaking is in operation at the University of Massachusetts. The university's Institute for Governmental Service brings in participants from all three campuses of the university to work with various governmental agencies in the development of programs for better health, welfare, transportation and environment.

These offer only a few isolated examples of the virtually endless amount of state and land-grant university research related to people's problems. Other types of research that should be mentioned include:

Historical— Research into the heritage of the nation and world may give insights of value to the present day. The University of Virginia, in cooperation with several other universities and historical groups, has for a

number of years been involved in a Ford Foundation project which has as its goal the compilation of the complete papers of the John Adams family, Benjamin Franklin, Alexander Hamilton, Thomas Jefferson and James Madison. The university's share of the grant is devoted to work on the Madison papers.

Archaeological—Key fossil discoveries are made yearly by scientists associated with state and land-grant universities. Although universities generally devote their study to sites within their own state, researchers have at times ventured far beyond these limits. For example, Ohio State University, through its Institute of Polar Studies, has done continuing research in Antarctica, Alaska, Greenland, Northern Canada and Patagonia of South America.

Child development—Studies on how and why children learn have become increasingly prolific in recent years. State and land-grant universities have been active participants in this research. The most long-term study has been underway at the numerous laboratory schools operated by these institutions. In addition to providing a proving ground for student teachers, these schools have served as ready-made research centers.

A growing number of universities are also beginning child development centers for more comprehensive study of the problems of childhood. One such center is the Frank P. Graham Child Development Center at the University of North Carolina in Chapel Hill, which offers special educational and training opportunities to many kinds of children, including the handicapped, from a very early age on up to teen-age. The underlying approach used at the center revolves around the child's need to receive and express information. Among activities at the center is a project involving a nationwide network of 67 demonstration programs for preschool handicapped children.

Education—Research relating to the curriculum of schools at all levels from pre-school through college is an adjunct of child development research. A brochure produced by West Virginia University describing

services of its division of Educational Research and Field Services sums up the type of applied research provided by most public universities in the field of education. The division, according to the publication, "is an evaluative, investigative, consultative and research organization which seeks to put the research knowledge and varied skills of West Virginia University to work for school systems, governmental agencies, institutions of higher education and other agencies."

Projects of the West Virginia unit include comprehensive school surveys, comprehensive school curriculum studies, evaluation of federal programs, in-service programs, college development programs, college feasibility studies, school transportation studies, public opinion surveys, school building surveys and management studies.

Programs outlined here at best constitute only a smattering of the total extent of state and land-grant university research. The pervading characteristic of research insures that it will always remain an integral part of the university as it attempts to serve its students and the public at large.

III "A Leading Object . . ."

1914 field demonstration of cotton crop from Oklahoma State University

"A Leading Object . . ."

The Morrill Act of 1862 stated that a "leading object" of the land-grant colleges "shall be to teach such branches of learning as are related to agriculture and mechanic arts."

Unfortunately, at that time there was a serious lack of trained teachers for technical education, particularly in agriculture. Since the answers to many farming problems were not to be found in textbooks, teachers and students went into the fields to discover the answers for themselves. This was the beginning of university research into the practical application of general scientific principles to agriculture.

Elementary as these early efforts were, they succeeded in gradually building a solid foundation of scientific agricultural knowledge. The teachers learned, the students learned and, more to the point, the farmers learned from them. Encouraged, the land-grant colleges enlarged their field laboratories and extended the range of their research.

As a consequence of their achievements and the recognized need for continued investigation of agricultural problems, Congress passed the Hatch Act in 1887. This Act established an agricultural experiment station in each state in connection with the land-grant college.

Thus, agricultural research became a major and distinctive educational tool of these institutions. The results of the research done in their experiment stations and in facilities established by other NASULGC member institutions have contributed countless billions of dollars to the economic welfare of the nation and have immeasurably enriched the lives of its citizens.

Results of Research

Forty years ago the president of Oregon State Agricultural College declared that the knowledge gained at the land-grant experiment stations and the diffusion of that knowledge to the nation through extension services had "changed deserts into gardens, evolved new and more profitable crops, multiplied production, created new industries, conquered disease, destroyed pests and plagues and made science the handmaiden of the housewife as well as the captain of industry."

The scientific discoveries made in university laboratories during the last few decades make this statement doubly true today. Agricultural research has meant improved health through the science of nutrition, the development of antibiotics and the discovery and control of zoomoses—animal diseases which are transmissible to man.

It has helped to provide an ample and reasonably priced food supply for the nation. The preservation of forests and other natural resources also has resulted from agricultural research.

To the farmers, research means improved crops, livestock and poultry. It means greater production through scientific soil management, the use of fertilizers and better cultivating and harvesting methods. It means more economical methods of processing and marketing farm products.

It means finding solutions to environmental pollution, discovering new sources of protein for the world's famished millions and creating more leisure time for farm people traditionally bound to their work from dawn to dusk.

The objective of the agricultural experiment station is primarily to serve the state in which it is located by conducting investigations and experiments that bear directly on the agricultural interests of that state. However, the stations have carried out this charge in ways that have often resulted in savings to local industries that in effect benefit the entire nation.

Through agricultural research, the University of California has saved the citrus industry $25 million annually. The introduction of aphid-resistant alfalfa varieties at the University of Nevada has increased the income of American farmers by $5 million. The development of a new variety of upland cotton at New Mexico State University is worth $10 million annually to Southwestern farmers. Years ago, thousands of acres in northern Indiana, formerly unproductive and abandoned by farmers, were reclaimed for productive agriculture as a result of research in soil and crops at Purdue University.

Introduction of new varieties of cane saved the Louisiana sugar cane industry from ruin caused by diseases affecting the old varieties. Prompt control of the cotton boll weevil, the European corn borer and the Mediterranean fruit fly by methods discovered at land-grant research stations helped save the cotton, corn and citrus fruit industries.

New industries have been developed in some states as a result of research in their experiment stations. The Atlantic Coast and Great Lakes region peach industry and the entire apple industry of the United States exist today as commercial enterprises because land-grant college research laboratories were successful in devising methods of controlling diseases and insect pests.

Research at Rutgers Agricultural Experiment Station seeks ways to make cut flowers last longer.

Working with plants at Delaware State College

West Virginia University foresters hope to expand state's maple syrup industry.

How One State is Served

Each experiment station serves its state in a variety of ways. An example is the University of California Experiment Station, which has been instrumental in making California a leading state in scientific and economic growth.

University scientists not only designed a machine to harvest California's tomatoes but an elongated tomato that the new machine could harvest more effectively. Research also aided the development of shakers for harvesting walnuts, almonds and prunes. The savings on the prune harvest alone are estimated to be $500,000 annually.

The potato yields in many southern California fields have been doubled through application of University of California research which revealed a phosphorus deficiency in the soil. Radioactive tracer chemicals established that cobalt is essential for alfalfa and minute amounts added to deficient soils increased yields twenty-fold.

In 1957, University of California investigators first tested a substance called gelberellic acid on grapes. Five years later it was being used on more than 20,000 vineyard acres to produce larger and tastier grapes. Now, lemon orchard managers use it to prepare their crops for harvest when demand is highest.

California's popular but dwindling boysenberry crop may have been saved by a university-invented picking maching that instantly freezes the berries as it harvests them.

To increase the production of honey, researchers are presently developing supplemental feeding methods for the honey bee. The honey yield per colony has already increased 50 to 100 percent.

Vaccines developed by University of California veterinarians control deadly virus infections in the state's beef herds and poultry flocks. Studies in breeding and nutrition are producing healthier, fatter, more profitable animals.

The university's forestry experts are searching for new ways to treat and use wood—largely an undeveloped California resource although the state ranks second only to Oregon in timber cut each year.

University of California water resources scientists are studying ways of using and preserving water—so precious in certain areas of the state it is called "California's colorless gold." The researchers are managing watersheds, changing irrigation methods and experimenting with the desalinization of ocean and brackish inland water.

These are some of the contributions just one university is making to one state's welfare and prosperity. Multiply them by the number of experiment stations in all the states of the union and the sum total of contributions staggers the mind.

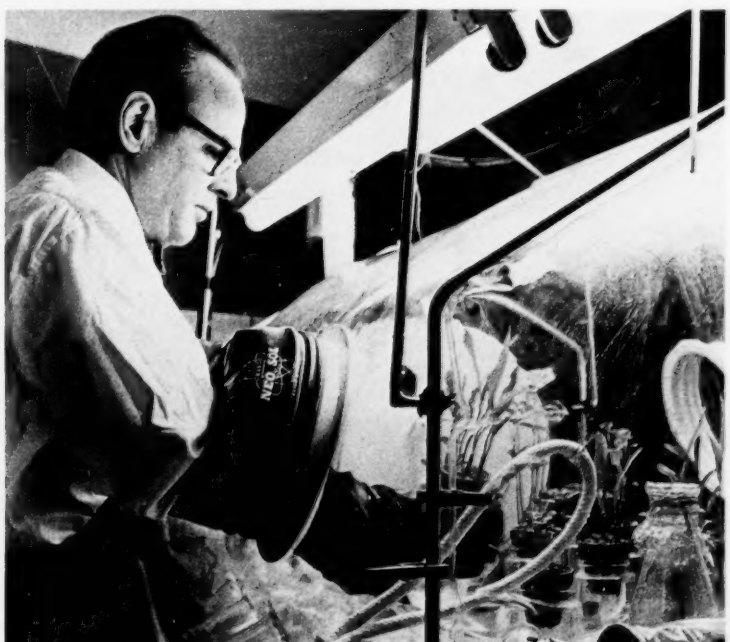
Agriculture and Medicine

The interrelationship between fields of research is borne out in agricultural investigation as in other fields. Study conducted in university experiment stations has, in a number of cases through the years, resulted in findings that have been of immense value to medical science. In 1945 aureomycin, an antibiotic similar to penicillin, was discovered in a soil sample taken from Sanborn Field, an agricultural experiment field maintained by the University of Missouri at Columbia. Aureomycin has been credited with saving millions of persons and animals from death.

The University of New Hampshire is one of several land-grant institutions where chemists are attempting to synthesize camptotheca acumenata, an extract from the bark of a tree growing in China, which has value in treating some advanced cases of intestinal cancer.

University of Georgia food scientists are studying common soil molds suspected as cancer-causing agents in some animals and humans. Virginia Polytechnic Institute researchers are working on studies of anaerobic bacteria (intestinal flora) believed by some scientists to be related to human cancer development.

In the area of veterinary medicine, the University of Mississippi is studying avian leukosis, a cancerous disease in poultry, hoping their findings will aid the study of human leukemia. A team of researchers at



Ohio State University plant pathologist works with plants growing in sterile isolator.

Michigan State University recently developed the first vaccine to work against a naturally occurring cancer in poultry, Marek's disease. Its control could save poultrymen up to $200 million a year and success with this vaccine might have some possible carryover value in the fight against human cancer.

These are only a few examples of the ways research in agriculture is benefiting the fight against disease.

The Auburn Fisheries Story

Though the solution of state and local problems is a primary responsibility of agricultural experiment stations, results of work at these stations often touch persons far beyond state boundaries.

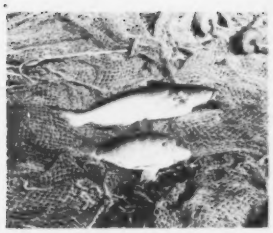
The fisheries story at Auburn University in Alabama is a pleasant example of how an unassuming project begun with the limited objective of serving a segment of a single state's population unexpectedly expanded to serve peoples on the other side of the globe.

Almost 40 years ago, Auburn's experiment station initiated a modest study entitled "Farm Ponds." The major purpose was to supply Alabama farm homes, then largely without electrical refrigeration, with a source of fresh protein during the long Southern summer months.

The first set of experimental ponds was constructed in 1934 with WPA labor. Through research and experimentation, scientists learned how to fertilize the ponds and thereby increase the growth of plankton, which in turn resulted in a many-fold increase in fish production.

Scientists stocked the ponds with a research-established, balanced population of carnivorous and foraging fish. The result was excellent fishing for bass and brean.

Thousands of these productive farm ponds were constructed in Alabama and, eventually, throughout the southern region of the United States. Sportsmen, too, built thousands of private ponds and managed them for good fishing. But the story had hardly begun.



Research on pen culture at Auburn University

As the reputation of the fisheries group spread, foreign students came to learn how to produce fish in managed waters to help supply protein needs in their own developing homelands. The Agency for International Development funded the establishment of an International Center for Aquaculture at Auburn and a university program of worldwide fisheries technical assistance.

Thus the modest Auburn "Farm Ponds" project not only met research and education challenges but grew to provide sport and food for the farm and non-farm public, aided in the development of a new industry (catfish) and became a part of the nation's technical assistance program in developing nations.

Waste management system on University of Nebraska research farm

Environmental Research

University agricultural experts actually pioneered environmental research on many campuses. Work on such vital agricultural and ecological concerns as the restoration of soil productivity, the disposal of animal wastes, air pollution damage to crops and insect control to reduce the need for insecticides has been underway for many years.

A committee that explored environmental concerns in the College of Agricultural and Life Sciences at the University of Wisconsin at Madison noted that management of the nation's natural resources for a better environment is merely a modern concept of the Morrill Act. The college is currently researching at least 143 environmental problems. One research project out of every five within the College focuses on some aspect of pollution and one dollar out of every four research dollars supports pollution-related studies.

One of the most ambitious studies of the entire nation's use of land, water and modern technology has been undertaken by the Iowa State University's Center for Agricultural and Rural Development under a $567,000 grant from the National Science Foundation. The study will attempt to determine whether, in the aggregate, new patterns of technology, land and water use can improve quality of water in rivers and streams while improving farm income or whether these patterns can be attained only through sacrifices in farm income and food costs for consumers.

War on Famine

As the world's population increases, the capacity of farmers to supply adequate food supplies becomes a matter of prime concern to all peoples. Research aimed at combating famine by increasing crop production and by discovering and developing new and nutritious foods represents one of the most significant achievements of land-grant university agriculturists.

In the past 30 years, yields of corn, grain, sorghum, potatoes and tomatoes in the United States have all quadrupled. Wheat and soybean yields and milk production have doubled.

According to Department of Agriculture figures, one farmer in the 1970's produces enough food and fiber for himself and 44 other people. And one hour of farm labor produces nearly seven times as much food and other crops as it did 50 years ago.

These have been the dividends of agricultural research.

The Land-Grant University and Agribusiness

Some critics charge that the land-grant university has become "the handmaiden of agribusiness." According to these censurers, the great food conglomerates have taken over the farms and have driven the "little farmer" out of business and caused a great rural migration to the cities.

In response, John T. Caldwell, chancellor of North Carolina State University, says: "One would think that it would be better for the tractor and combine not to have been invented."

People take for granted the dazzling array of abundant foods available to the public and there is a vast ignorance about today's agriculture, according to Caldwell.

Work with soybean at land-grant universities has been boon to world.

"How many people know, for instance, that the capital investment per worker in farming is moving toward 100,000 dollars? Or how small the return a small farmer gets on his investment of capital and labor?

"There is little romance in going broke or in not knowing from one crop to the next that the mortgage can be paid," Caldwell observed. "There is little romance in not having enough to afford minimum family transportation. There is little romance in not having good schools for the children, or in not having a doctor somewhere around."

Caldwell believes it to be the duty of the land-grant colleges to do whatever they can to make farms, big and small, profitable, to make rural life more agreeable and to mitigate the hardships of rural transformation.

"I have first-hand knowledge of efforts to assist undeveloped and underdeveloped agricultural economies of other nations to improve their efficiency and their output in the interest of their people," Dr. Caldwell comments. "In these circumstances, much of what we in the United States take for granted stands out starkly as a giant need. Research is a need: on soils, on pests, on seeds. An array of services is needed, what we call the agribusiness complex. Who is going to furnish the viable and reliable seed? Who the fertilizers? Who the insecticides? And when the crop is ready, who is going to buy it and store it and transport it and

get it to market at a time and in a condition that makes it saleable? Who is going to furnish the credit for either the little operator or the large operator that will help improve his efficiency, improve his income and raise the level of life for his family?

"An overwhelming urban population can easily take for granted an efficient agriculture. And then those few who become concerned about it may bring with their concern an ignorance, and innocence, and a romanticism that misses the point entirely," Dr. Caldwell said.

"For thousands of years men have used their intelligence to try to free humanity from drudgery and burdens that sustained only poverty for all but a few. Man has sought to release himself, his body and his time and his mind for a higher quality of life. The goal of the land-grant colleges has been to further man's accomplishments on behalf of the human spirit. Nowhere has this success been more apparent and brought more blessings than in the agricultural enterprise and the homes of rural America."

President Alvin M. Thomas of Prairie View A & M College had this to say about the role of the "1890" predominantly black land-grant colleges as partners of the older land-grant institutions founded under the 1862 Morrill Act.

"While it is an historical fact that the 1890 colleges have not received an equitable allocation of financial resources, the prospects of positive change loom ahead. It is encouraging to note that the black institutions are receiving and profiting from an increased level of financial support from federal agencies, especially the United States Department of Agriculture. Through USDA, $12.8 million for research and extension became available to the 1890 colleges in FY '72. The major thrust of practically all of the funds provided 1890 colleges went into people's problems, or projects aimed at the people, their families, their income, their welfare, their health, or their communities.

"An important start has now been made," Dr. Thomas concluded.

Helping solve rural problems is part of public university commitment.

IV Carrying the Campus to the Community

Early county agent at Kansas State University makes personal inspection trip.

Carrying the Campus to the Community

Carrying the classroom beyond the campus is an idea that originated with the land-grant institutions. From the beginning they took the results of experiment station research directly to the people who most needed them—farmers and their families.

This first venture into the community with practical knowledge of benefit to people in their everyday lives has blossomed into the multitudinous public service activities of today's state and land-grant universities—known as extension.

Cooperative Extension

Continuing education for adults, community aid and cooperative extension efforts carried out by the land-grant institutions all fit under the extension umbrella. All activities have one thing in common. They bring the two other major functions of colleges and universities—teaching and research—to bear in serving all the nation.

The Smith-Lever Act of 1914 authorized land-grant colleges and universities to do what they were already doing—to give instruction beyond the boundaries of the campus—and provided annual appropriations for this work.

The program developed under the act is called Cooperative Extension. It is a joint venture of the U. S. Department of Agriculture, the land-grant colleges and universities and, in some cases, state departments of agriculture. It has written an impressive chapter in university-community relations and is widely respected for the dedication of its agents and the effectiveness of its programs.

Agriculture extension began at a time when America's production needs were acute and farmers desperately needed aid in improving farm lands, increasing crop yields and breeding and caring for livestock.

As researchers discovered new ways to apply science to these problems, agents from the experiment stations criss-crossed rural areas carrying the message and, in effect, extending the boundaries of the campus to the boundaries of the state.

While the agronomists aided the farmer, home economists aided the farmer's wife, visiting in the home to demonstrate new methods of food preparation and to advise on child care. Eventually, almost every county of every state had its own agricultural and home demonstration agents to advise on and serve its particular needs.

Four-H clubs were established by the Cooperative Extension Service to encourage farm youths from ages nine to nineteen to develop farm and homemaking skills.

Besides making personal visits, extension agents have disseminated the results of agricultural research through the publication of bulletins for distribution to individual farmers requesting specific information. Over the years, universities have published a virtual library of pamphlets designed to offer farmers practical counsel. The titles range anywhere from "The Effect of Artificial Lighting on Egg Production" to "Directions for Disinfecting a Well." It is, in fact, doubtful that a farmer today would be able to name an agricultural subject about which he cannot obtain, free, an informative pamphlet from his land-grant extension service.

Current Cooperative Extension programs are changing their emphasis to meet new needs. Agricultural adjustment centers are working to help farmers adjust to a new kind of world in terms of price and production methods. Extension directors believe the farmer today needs help in understanding and evaluating what is happening and advice on how to extend his economic base.

Meanwhile, cooperative services for women have reached beyond the farms to include low-income urban residents. One of the best examples of this new approach is the federally-funded Expanded Food and Nutrition Education Program, started in November, 1968 as a means of reaching poor families, both urban and rural, with information about good nutrition.

This is accomplished by hiring and training nutrition aides from the communities which will be served. These aides, who know the problems because they have been there themselves, then carry their new-found expertise from door to door, going into homes, gaining the confidence of homemakers and then determining what the needs are. Aides become involved in cooking, budgeting and shopping, with the primary goal of teaching the impoverished homemaker to provide a better diet for her family by the use of inexpensive but nourishing foods.

The aides visit each home repeatedly and often pitch in to help clean up backyards, change the baby, make up shopping lists, care for the sick and introduce families to such things as food stamps and the intricacies of welfare regulations.

County agents now go to farmers via television.

Tennessee State University extension course in crafts

Nurses take course through telelecture system operated by West Virginia University's Medical Center.

Some 8,700 aides have been trained by Cooperative Extension Services of land-grant universities in all 50 states, the District of Columbia and Puerto Rico. These aides, in turn, have reached 360,658 families and a total of 1,700,000 people. A companion program aimed at youths of impoverished families has enrolled 51,000 volunteers in serving 866,000 young people.

The 4-H Clubs also wear a new look. The programs are being restructured to reach all young people, rural and urban, and to be more responsive to the varied needs of today's younger generation.

In the mid-1960's, 4-H Clubs moved into the ghettos and began to offer a wide variety of projects such as crafts, outdoor cooking, karate, nutrition lessons, photography and bicycling, as well as pet care and basic homemaking skills. The result is that membership in the clubs has jumped to more than four million American youths.

Lifelong Learning

As successful and necessary as Cooperative Extension has proved to be, it has long been evident that it is not enough. Today both state and land-grant institutions are assuming increasing responsibilities in adult education.

The growing need to provide lifelong learning experiences is leading these universities to extend themselves even more than they have in the past. Changing career patterns and new demands for updated knowledge have made it essential that higher education institutions offer an increasing number of opportunities for adults to drop in and out of the university at will.

"Higher education has traditionally focused upon the education of youth, the 18-24 year old group whose potential lay in the future," noted Clifton R. Wharton, Jr., president of Michigan State University. "Today it is no longer adequate to educate the youth of our society and expect that educational experience to suffice for a lifetime. For in the 20 to 30 year interim between graduation and their rise to positions of influence, the fundamental values and knowledge of our society may have changed dramatically."

While some form of continuing education has existed almost from the start, the needs of an urban society now demand that this concept per-

vade all aspects of the institution. State and land-grant universities are attempting to meet the new challenge with the same vigor and directness with which they met the needs of rural America more than a hundred years ago. In some states the continuing education program is already so comprehensive that it is probable that at least one person in every township is participating in one of the activities provided.

Academic courses are taught in formal daytime and evening classes, conferences, seminars, workshops and institutes. They are conducted by correspondence, television, radio and cassette. They may be taught in local high schools, factories, elaborate residential centers or in regular college classrooms.

They are taught by full professors, student teachers, volunteers and professionals eminent in their fields. They may last a few weeks or a full semester. They may or may not be taken for credit.

They may enroll grandmothers, doctors, grade school dropouts, teachers, laborers, businessmen, housewives. In short, any person who wishes to further his education.

Many adults take such courses to increase their earning potential by the acquisition of higher degrees. Others seek to enrich newly-found leisure time. Still others, perplexed by changing times and mores, are seeking answers in books.

University of New Mexico trains local citizens in emergency services techniques.

Business executives participate in management program sponsored by University of Pittsburgh.

Continuing education is particularly appropriate for professionals such as teachers, lawyers, dentists, doctors, engineers and businessmen who take extension courses in order to update their skills. So rapidly is new knowledge being produced in these fields that professionals who do not return periodically to the classroom quickly lose their effectiveness. In some cases universities actually contract with business, industries and school systems to provide "in-service" training for personnel.

Continuing education divisions of state and land-grant universities also provide job training for persons who want to learn new skills in a large number of fields as diverse as fire fighting and date processing.

The extensiveness of continuing education offerings make a head count of persons reached almost impossible. However, a summary of enrollments in various educational extension programs made by the University

of North Carolina at Chapel Hill hints at what is happening across the nation. The university found that during the 1971-72 academic year, enrollments in various extension activities included:

1,646 undergraduates in 85 correspondence courses.

1,792 undergraduates in 86 "Evening College" courses.

830 graduates in- and off-campus evening college sessions.

210,365 North Carolinians reached through film and TV showings, in courses, workshops or conferences.

600 dentists in the state studying new techniques through the UNC Dental School.

224 physicians in the state who received 1,389 hours of instruction.

8,000 people attending schools and conferences sponsored by the Institute of Government.

Residential Centers

Although continuing education activities flourish in local high schools or community centers, in some cases universities have established residential adult education centers with the capacity to accommodate scores of programs simultaneously. The centers include hotel rooms for the use of participants.

The first such center was opened in 1951 on the campus of Michigan State University with a grant from the W. K. Kellogg Foundation. More than a million adults have taken part in educational conferences and other meetings in the facility since it opened its doors. These adult students have come from all walks of life, from all over the United States and from 100 or more nations around the globe.

In addition to serving as a conference site, Kellogg Center is the headquarters for most of the major segments of MSU's Continuing Education Service—Conferences and Institutes, University Extension (off-campus courses), Evening College, International Extension, Insurance Programs, Community Development, Highway Safety and Nursing Home Administrators Programs.

The Kellogg Foundation followed up its original gift to MSU with grants which helped create centers at the Universities of Georgia, Nebraska, Oklahoma and at three private institutions— the University of Chicago, Notre Dame and Oxford. In 1970 the New England Regional Center, a joint effort of the region's six state universities, was opened with the assistance of another Kellogg grant.

Other residential centers, patterned after the Kellogg centers, have appeared on state and land-grant university campuses. Primarily designed for group activities, these centers have proved especially adaptable for use by business and industry in conducting training programs. The centers usually contain both large and small conference rooms, libraries, lounges and restaurants, recreation rooms, staff offices and hotel rooms.

Pennsylvania State University uses this mobile classroom to take education to the student.

Programmed Extension

The use of television and radio as a mode of educational extension is now commonplace. However, other inventions of the technological age have further expanded the opportunities for reaching people without actually transporting teachers to them.

Kansas State University estimates that 90 percent of the people in Kansas are within 25 miles of one of the 15 off-campus classrooms now being served by its Remote Teaching-Learning Tele-Communication Network. Both credit and non-credit courses have been offered by telephone through the system since 1971.

Pennsylvania State University utilized a computer-on-wheels to set up the country's first educational drive-in. The van, which is fitted out with a central computer and 12 terminals, parks for stays of six to ten weeks in local school yards.

This gives teachers who can't leave home to attend classes at the university a chance to take graduate courses in their own backyards. Teachers can schedule courses at their convenience and complete them at their own pace.

Another self-help educational program of a completely different type is underway at the University of Tennessee at Knoxville. The UT Adult Learning Center is helping area adults improve their skills in subjects from reading and math to consumer education and foreign languages. It is open to anyone 16 years of age or older who has not received a high school diploma. Programmed materials and other self-instructional programs and audio-visual aids make it possible for the adult to enter at his own level, learn at his own pace and decide what, how and when he wants to learn.

Cultural Extension

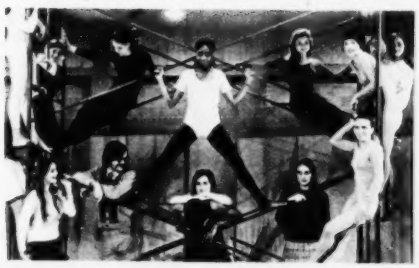
Traveling libraries, concerts, theater and art exhibits make up another form of extension. University-sponsored programs in the performing arts often provide citizens with their only contacts with "live" music, dance or drama. The public learns to appreciate the arts through such performances and is encouraged to participate by attending discussions, conferences and related courses.

As an example, musically talented residents of Corvallis, Oregon, a city of some 35,000 people, are invited to play in concert with the Oregon State University orchestra. Arizona State University makes its symphony orchestra available for youth concerts in which thousands of children are bused to the university auditorium from surrounding areas.

The University of Texas conducts a Junior String Project heralded by musicians and educators as a priceless program for the development of young talent and the training of teachers. Students, ranging in age from four to eighteen, may take a broad curriculum including instrumentation lessons, theory, orchestra and chamber music instruction from advanced string students.

West Virginia University drama students designed a puppet mobile which tours the state giving free puppet shows in school yards and town squares.

This is the merest sampling of cultural opportunities which are made available by virtually all state and land-grant universities to communities. As a happy result, community funds and private support often are given for fellowships and scholarships for gifted student artists and for the production and enlargement of specific extension programs. Thus the land-grant universities bring the arts to the community and the community, in turn, brings its resources and support to the universities.



Extension for Servicemen

Extension programs designed by land-grant universities provide course work for credit to U. S. military personnel stationed in the United States as well as abroad. This particular example of university extension is aimed at the GI who wants to work for a degree in his free time.

The University of Hawaii reports that 40 percent of its evening students are U. S. servicemen. The University of North Dakota maintains extension centers at Minot Air Force Base and Grand Forks Air Force Base. South Dakota State University provides educational services for the military at its Air Force Institute of Technology.

Among other university centers serving military personnel are Mississippi State University's center at Columbus Air Force Base, the University of Nebraska's center at Offut Air Force Base, the University of North Carolina System's center at Fort Bragg, the University of Oklahoma's centers at Tinker Air Force Base and at Fort Sill and Florida State University's centers at Eglin Air Force Base and the Pensacola Naval Air Station.

Undoubtedly the most extensive program for servicemen, however, is conducted by University College of the University of Maryland, with 183 centers in 24 foreign countries along with a number of centers in Maryland and at the Pentagon in Washington, D. C. The overseas program was started shortly after World War II at the request of the U. S. Army, which wanted educational offerings to GI's expanded.

Since the beginning, these centers have enrolled more than a half million servicemen, government personnel and their dependents stationed in Europe and the Far East. In 1971-72 there were 34,787 students enrolled in the various centers.

The majority of offerings are limited to freshman-sophomore level courses because this constitutes the biggest need. However, there have been 10,000 graduates of University College since the beginning, and 685 degrees were awarded in 1971-72 alone. In addition, many servicemen continue their educations either at branches of the University of Maryland or at other colleges and universities in this country.

University extension systems also are utilized by federal and state agencies for the training of VISTA personnel, Job Corpsmen, community action leaders, labor and urban affairs experts and for the education of the public in survival tactics in the event of a nuclear disaster.

Meeting Community Needs

Helping dropouts pass high school equivalency tests is still another way in which universities try to meet educational needs of the areas they serve. In addition, some universities have set up programs for aspiring students who do not meet college academic requirements. Such programs provide remedial work which helps students bring their grades up to the level at which they can gain admission to a university.

Ohio State University provides tutorial program for inner city youngsters.

Wayne State University's East Side Community Extension Center, located in a depressed Detroit neighborhood, offers one of the largest college preparatory programs of this type in the nation. Anyone 18 or older who demonstrates an interest in pursuing a program of study at the university, even though he may not have a high school diploma, can be admitted to the urban extension program on a trial basis. Upon the satisfactory completion of a required number of courses, he can be admitted to the university and credited with the courses completed. There were more than 400 students enrolled in the program during the 1971-72 academic year.

The center also offers assistance to persons wishing to prepare for high school equivalency tests and a number of vocational training courses for anyone who wants to learn a skill.

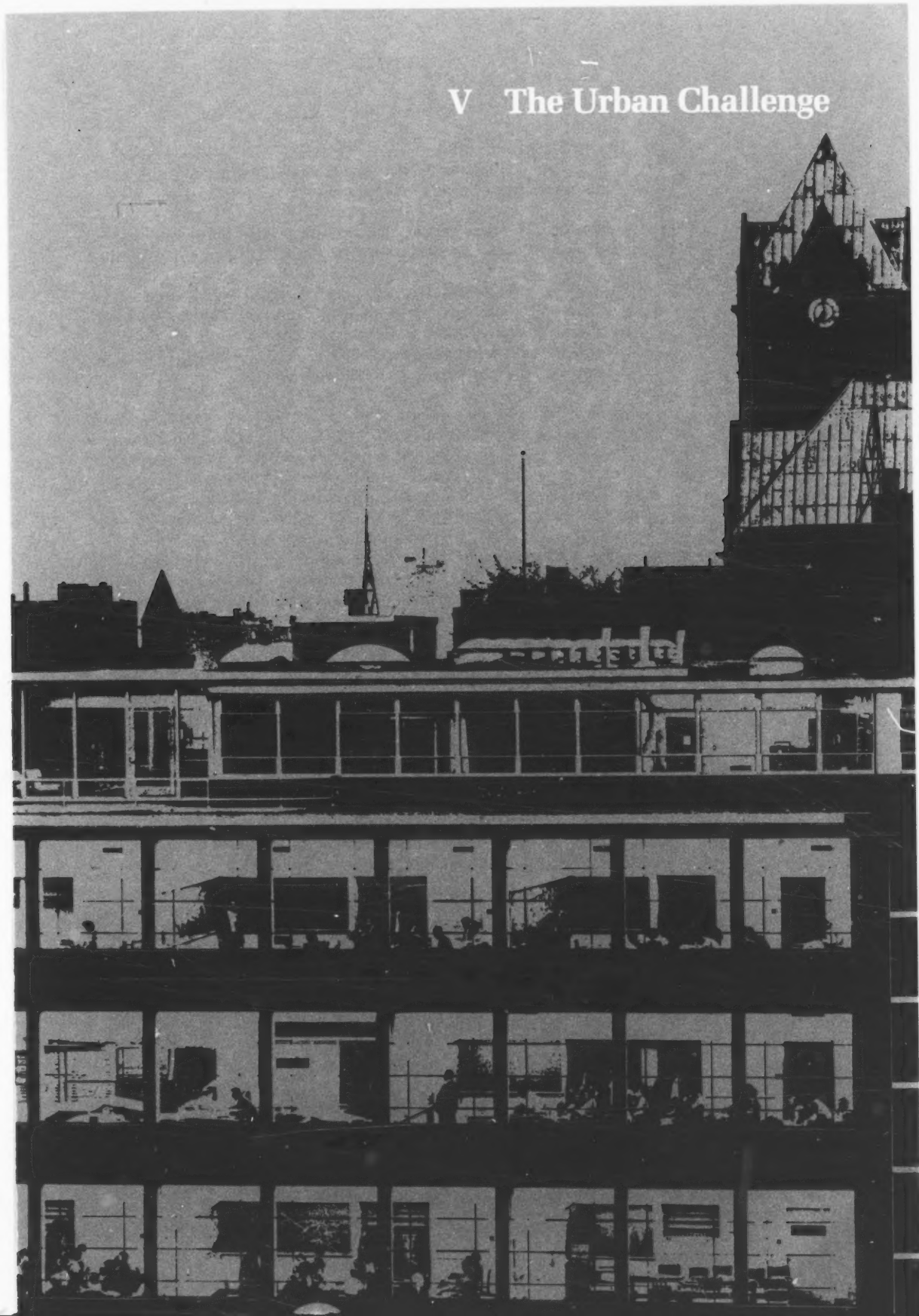
The Wayne State center is one of the best examples of a new comprehensive approach to meeting the needs of urban residents. It provides a central place where community members can go and participate in a wide range of activities, free of charge, which have never been available to them before. Community-oriented workshops on such subjects as housing and voters' rights are a part of the educational program, and the center's library is open to residents of the area.

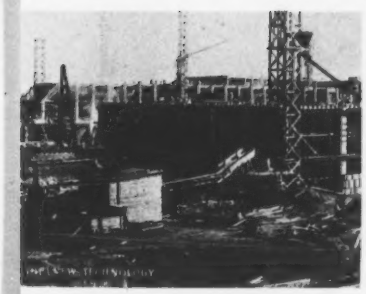
A recreational program, drama and dance clinics, a game room and music, sewing and arts and crafts courses are other components of the center's activities.

Blind student at University of California, Irvine teaches extension course in computer programming for blind students.

Three boys enjoy life at summer recreational program offered by University of Wisconsin—Extension.

V The Urban Challenge





Massachusetts Institute of Technology Cambridge Campus under construction

The Urban Challenge

The basic commitment of the nation's state and land-grant universities to service for people is tested in trying to cope with the pressing demands of the American society of the Seventies.

Formed to serve a population that was 85 percent rural, these universities are now called upon to serve a society that is 70 percent urbanized.

Beset by overcrowding, jammed transportation, delinquency, crime, decaying neighborhoods, water and air pollution, community health problems, inadequate schools and a dozen other nightmares, the cities' teeming masses are in urgent need of the kind of attention the land-grant colleges gave to rural Americans a hundred years ago.

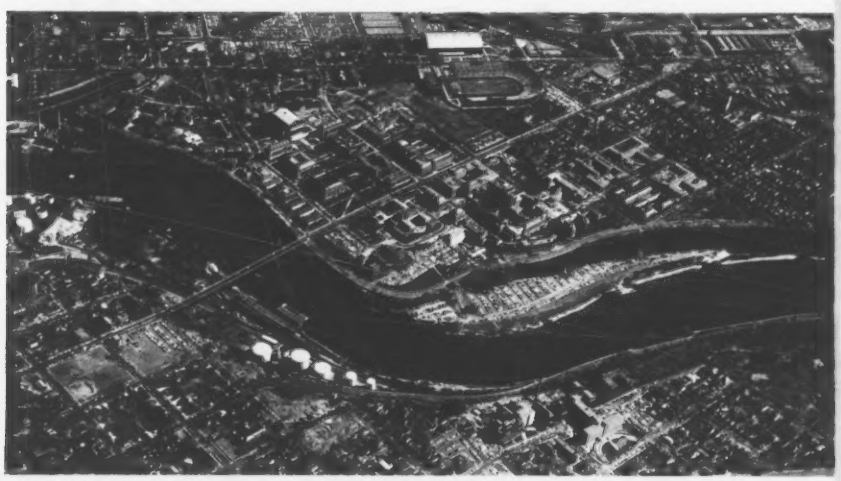
The response of state and land-grant universities to this crisis has been one example of their capacity to adjust to the changing demands of society. Using their resources of knowledge and research, they have been seeking answers to seemingly unanswerable questions. In searching for solutions to urban problems, the universities have had no precedents to go by, no proven courses of action. They have been learning by trial and error.

There is dissent among educators about how active a university should be in dealing with the often debilitating problems of the nation. Some argue that a university's function is to provide indirect aid, through teaching and research relevant to the problems at hand.

Others strongly disagree. They point out that a university—particularly a public one—has an overriding responsibility to participate actively.

"Conditions today demand a crusade, not a trip to the library," stated one proponent of direct university involvement.

Old town-gown animosities are fading in the face of mounting recognition of the fact that American universities can no longer afford simply to study social problems. Despite arguments to the contrary, universities have become increasingly involved in activities aimed at providing solutions to the urban crisis.



View of University of Minnesota St. Paul campus

Urban Campuses

The concept of a truly urban university and its responsibilities to the city dweller is a special challenge to some land-grant colleges and state universities, which either already are located in urban areas or have deliberately built new campuses in such areas and voluntarily assumed the problems and pressures attendant upon so close a relationship.

The University of Illinois at Chicago Circle is a national model of a public university built in the heart of the city to educate masses of metropolitan youth and at the same time to use its resources to help solve urban problems.

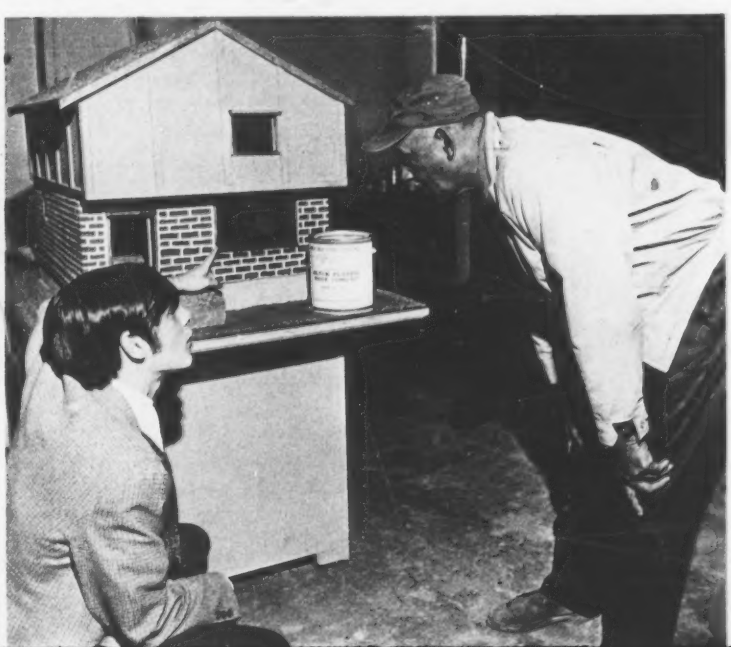
Built in the 1960's on urban renewal land close to the Loop, Chicago Circle has a commuting student body of more than 16,000 students. The 28-story administration building and a three and a half acre elevated granite and concrete slab—a raised courtyard which provides access to classrooms, library and laboratories and is centered with an amphitheatre —dominate the mid-town campus.

The student at Chicago Circle must be highly qualified academically to meet the university's standards. Yet, mindful of its obligations to its neighbors, the university maintains an educational assistance program in which it accepts a number of underqualified students and assists them financially and with special tutorials to "make the grade."

The Chicago Circle Center for Urban Studies is a major university operation having among other objectives the education of future civic leaders and the training of professional personnel for government, social and welfare agency work.

Discussing plans for the future, a Chicago Circle spokesman declared:

"Chicago Circle intends to be the urban equivalent of the historic land-grant university—comprehensive yet distinctive in its mission as an urban catalyzer. While not neglectful of instruction in conventional areas, it will also be involved in service to the community and devoted to problem-centered research."



University of Missouri, St. Louis student works with minority businessman as part of "St. Louis Seminar."

Housing specialist with University of Missouri, St. Louis surveys decaying property in neighborhood scheduled for rehabilitation.

In 1963, the University of Missouri, with its main campus in Columbia, opened a new campus in St. Louis. The trustees and administrators acted on the belief that the land-grant university should be a service institution. Therefore the university moved to provide its resources and services to urban residents.

The St. Louis campus in 1973 had about 8,000 students. One-third of the enrollment was made up of part-time students who fit their classes around their jobs. In its short history, the St. Louis campus has found that 85 percent of its graduates remain in or return to the city, enriching the area with their university-taught skills.

Students use the city as a laboratory in which to study urban affairs. An independent study program, "St. Louis Seminar," gets the students off campus to work under faculty supervision in city and county offices and related social agencies.

The university's extension division works in all St. Louis neighborhoods teaching reading and writing and helping people upgrade skills ranging from plumbing to nursing. The Center for Metropolitan Studies is helping the Normandy Municipal Council, an unofficial agency composed of city officials from north St. Louis, who are working to improve the entire area in which the campus is located.

Washington State University student teacher works with children at nursery school in housing project.

The City University of New York in 1971 added two new urban colleges to its 19-college system. LaGuardia College in Long Island City is the first community college in the country to offer work-study programs to all of its students. A former factory houses the new college which opened with a freshman class of 524, the majority of whom came from the Queens area and named LaGuardia as their first college choice.

The academic year is set up on the basis of four semesters, each lasting 13 weeks. All freshmen are in the classroom for the first two semesters, then alternate with a semester of work and a semester of classes for the remainder of their stay. A cooperative education department locates jobs connected with the students' fields of interest.

Medgar Evers College, located temporarily in a renovated Masonic temple in Brooklyn, was established to provide a means of upward mobility for needy New York residents such as those from the Bedford-Stuyvesant area.

The experimental college offers two- and four-year degrees with areas of specialization in educational, technological and commercial fields. Remedial work is accomplished through a required special core curriculum representing one-third of the course load. Early in the planning phases of Medgar Evers, a community advisory council was established consisting of community representatives and elected public officials who are involved in every phase of planning for the college.

University of Alabama home economics students play with children in urban ghetto.

Urban Teacher Training

One of the most difficult and perplexing problems for educators today is the training of teachers for inner-city schools. Awakening teachers to the challenge of teaching less advantaged students is a major new thrust in education and practically all land-grant institutions and state universities are engaged in the effort.

At the University of Michigan, education majors are themselves sent to school in Detroit's inner city in preparation for teaching there. Classrooms may be in a precinct police station, a neighborhood welfare agency, the home of one of the school children. There students gain firsthand knowledge of the community, its aspirations and its shortcomings and become better prepared to serve that community in its schools.

Many other universities are following the same plan. Indiana University is providing its education majors with extensive work experience in low-income communities. The student is expected to gain some understanding of the needs and motivations of students in the community by serving as a worker there.

Opportunities are available for working with community action or other social welfare agencies, industries, recreation agencies, conventional and

non-conventional schools and for giving direct educational assistance within a home setting.

"The real benefit to the college student," says an Indiana professor of education, "is his own personal development through direct involvement with children who need him most."

In the mid-60's, Ohio State University introduced a "Preface Plan" to provide urban-oriented teachers for Cleveland's slum area schools.

In the summer preceding their first assignment, 21 teachers went through a rigorous six-week training period with many community agencies cooperating to prepare them for the types of experiences they would encounter in their assigned schools. These experiences, often frustrating, defeating and traumatic, are largely responsible for the high incidence of teacher turnover in inner-city schools.

During the first teaching year, the teachers returned to Ohio State for monthly seminars to discuss problems and to seek advice from experts. The program was so successful that when the year was over 20 of the 21 teachers elected to stay in that type of school although only eight had this intention originally.

Since then, Ohio State has expanded the program to include slum area teaching experience for its undergraduate education majors. Even sophomores are utilized in the schools as paid teaching aides.

Other programs at Ohio State are aimed at the recruitment of inner-city blacks for the teaching profession. Interested high school juniors are trained to read to inner-city school children. The project gives elementary school children a pleasant taste of good literature and lets the high school student find out what it's like behind the teacher's desk.

Children from blighted neighborhoods often speak a language as incomprehensible to teachers as the teachers' vocabulary is foreign to them. No one can understand the language of the street better than the school dropout. A "New Careers" program at Ohio State recruits dropouts between the ages of 22 and 30 for intensive, two-year teacher training for future jobs in poverty area schools.

All these plans are in response to the plea of urban parents and community leaders to "give us teachers who understand the problems of urban children." The challenge is being met by the state and land-grant universities.

Consumer Counseling

"Am I being cheated?"

"What does this contract say?"

"Is this thing safe?"

These are consumers' urgent questions—whoever and wherever the consumer. The state and land-grant universities are trying to provide answers.

A family can raise its standard of living as much as 15 or 20 percent with more careful buying habits, according to home management specialists at the University of Minnesota, which for years has provided counseling

services to consumers. Pennsylvania State University has a program to instruct teachers in teaching economics to disadvantaged children. The purpose: To educate the child to become an informed consumer.

The Center for Consumer Affairs at the University of Wisconsin in Milwaukee has been at work for more than ten years researching consumer problems. For example, one project tested the lead content of toothpaste tubes with the result that a leading manufacturer which was using a tube with a high lead content was forced to take the item off the market.

The University of Tennessee at Chattanooga operates a series of consumer information and assistance centers throughout the city in cooperation with such local agencies as the Department of Welfare and the Legal Aid Society. Students help staff the facilities.

The centers came about as the result of a university project which trained selected community leaders in the techniques of consumer education. The leaders then went back to their centers to lead consumer sessions for people throughout their areas.

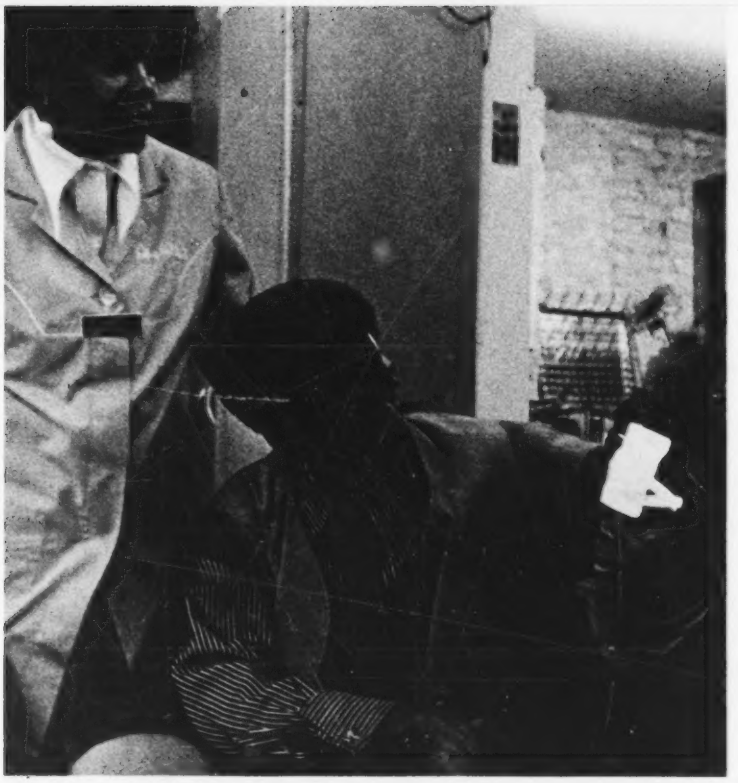
Some of the topics covered in such sessions are: Installment contracts, consumer protection laws, renting and home ownership, budgeting, savings, credit, food stamps and other welfare programs.

Expanded Nutrition Program teaches poor families how to stretch food dollars and plan nutritious meals.

Medical-Legal Services

It always has been a function of the university medical schools to serve their communities. Indeed, this service is often taken for granted, especially by low-income persons.

In addition to caring for the ill, the medical schools also serve the community by providing nutrition counseling, venereal disease detection services, family planning aid, alcoholism control programs and high school health testing programs.



Working with patients at Valley Outpost Clinic run by the University of Illinois Medical Center

Similarly, the law schools of the public universities serve the urban communities in a variety of ways, notably by providing legal aid to indigents and by helping to enforce consumer protection laws.

Training of Urban Specialists

In an effort to upgrade the cities, the state and land-grant institutions seek to interest and train more students in civic government as a career. In fact urban studies is one of the most rapidly expanding programs at state and land-grant universities. Several universities have opened new colleges, offering four-year and, in some cases, graduate degree-granting programs.

Programs are interdisciplinary in nature, designed to prepare graduates to enter the urban arena to add their expertise to the forces battling to save the nation's cities from decay.

The first of such programs was offered by Michigan State University, which opened its College of Race and Urban Affairs in 1971. Its purpose: "To concern itself with particular racial and urban problems central to the quality of life in Michigan and the nation." This succinctly states the purpose of all such programs.

Urban Research

Utilizing their research facilities, many land-grant and state universities are looking in the laboratory for the solution to urban problems.

On many campuses special centers have been set up specifically to deal with urban research. They serve as coordinating bodies for research related to problems of the cities—problems which require the research capabilities of engineers, urban planners, economists, educators, psychologists, sociologists and management specialists, among others. A

lack of coordination has been a shortcoming of much urban research in the past. As one educator noted:

"The reason universities have been somewhat ineffective in the cities is not that their researchers have failed to do their jobs, but rather that they have not been working together."

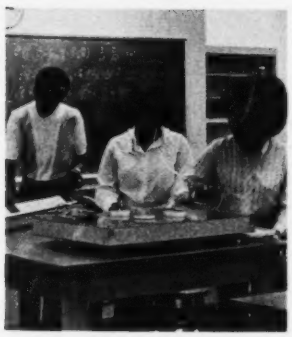
Urban centers carry out studies of population and economic trends, social problems and objectives, development costs, public finances, intergovernmental relationships, urban design, transportation, health, housing, recreation and law enforcement.

Although most centers concentrate on local or regional problems, many research findings have applications of nationwide value. For example, the problem of urbanizing people from rural areas and small towns—without the poverty and frustration which have been the American pattern—was the first concern of the University of Iowa's fledgling Institute of Urban and Regional Research. The Institute seeks to discover whether many American people who are not drawn to metropolitan areas by skills or interest can live in small cities planned to meet their individual and social needs.

As urban centers grow in number and acceptance, they are also being utilized increasingly by federal agencies to conduct research related to nationwide problems. For example, a major analytical study of the potential effectiveness of governmental direct housing assistance to low-income families is being carried out by the Joint Center for Urban Studies of the Massachusetts Institute of Technology and Harvard University. It is being conducted with a grant from the Department of Housing and Urban Development.

Colorado State University professor examines scale model of Fort Wayne, Indiana before beginning wind tunnel tests.

VI Opportunity for All



Opportunity for All

The great national endeavor for America's institutions of higher education in the late 1960's and in the 1970's has been to establish thoughtfully planned and conscientiously pursued programs for culturally and educationally deprived students.

No one would pronounce the effort an unqualified success, but the commitment has been accepted and the attempt to widen educational opportunities for minority students is a major concern. The aim is to make it possible for disadvantaged Americans—Negroes, Chicanos, Indians, Eskimos and Orientals—to participate more fully in the life of their country.

The major emphasis has been placed on programs for black students since they represent the nation's largest minority group. Here, the state and land-grant colleges and universities have had long experience.

1890 Colleges

In the Nineteenth Century seventeen Negro colleges were founded or designated as land-grant colleges in Southern and border states to conform with the requirements of the second Morrill Act, passed by Congress in 1890. The act provided that no money would be paid to states for land-grant institutions where a distinction of race or color was made in the admission of students. However, it did allow the establishment of separate institutions for blacks and whites.

In their early years, most of these colleges concentrated on teacher education and were sometimes derisively called "teacher-preacher factories." Today the term is as inapplicable as "cow college" is to the universities which have evolved from the original land-grant colleges.

Of the initial seventeen colleges, fourteen institutions remain as separate entities. West Virginia discontinued the separate Negro land-grant college status of West Virginia State in 1957. Maryland State College became the University of Maryland at Eastern Shore in 1970 and Arkansas AM&N College became the University of Arkansas at Pine Bluff in 1972.

The contribution that these institutions have made to the education of black students through the years is beyond measure. Without them, many black students would not have had an opportunity for a college education at all. Despite the increasing concern of predominantly white institutions with providing educational opportunities for blacks and other minority groups, the importance of the black land-grant colleges as major producers of black leaders is still of vast significance.

According to a 1970-71 survey of the institutional members of the National Association of State Universities and Land-Grant Colleges, there were approximately 100,000 black students at these colleges and universities. Approximately 46,500 of this number (or almost half) were enrolled in the black land-grant institutions and in Texas Southern University, the other public black institution holding membership in the Association.

Total enrollments in the black land-grant colleges reflect a growing student populace of white as well as black students. The colleges have talented and dedicated faculties, 30 percent of whom hold Ph.D. degrees. The "brain drain" caused by the loss of a number of distinguished black educators to predominantly white universities in recent years is countered by the successful recruitment of many young and enthusiastic teachers—white and black—from the nation's outstanding graduate schools.

Further upgrading of faculties is achieved by cooperative arrangements between the predominantly black colleges and principal state universities which provide for an exchange of faculty members and students.

These "reciprocal enrichment programs" enhance the academic program of the black colleges and promote racial understanding at the white institutions.

One example of this type of reciprocal arrangement is a joint cooperative program between the Pennsylvania State University and Alabama A&M University, which led to the establishment of a Master of Business Administration at Alabama A&M. Pennsylvania State donated 2,000 volumes to a business administration library at Alabama A&M and the two universities set up management development seminars and faculty interchanges.

Delaware State College has joined with the University of Delaware in a cooperative program for training engineers, and North Carolina A&T University and Rutgers have established cooperative training for students enrolled as teacher majors.

In response to student interests, the traditionally black colleges offer a broad variety of educational programs ranging from anthropology and engineering to sociology, business, music, black studies and law.

Degree production moves steadily upward. Ten thousand degrees were awarded by the black land-grant institutions and Texas Southern University during the 1971-72 academic year. The largest share of degrees still is awarded in education, but as job opportunities expand and students find their options widening they are entering new fields in large numbers.

Students at South Carolina State College offer swimming instruction to low-income youths.

Herman B. Smith, director of the Office for Advancement of Public Negro Colleges of the National Association of State Universities and Land-Grant Colleges, has summed up the contributions of the black land-grant institutions:

"These colleges, in many respects, are truly national resources. In addition to serving their respective local areas as responsible and responsive centers of education and service, their alumni make important contributions to society across the entire nation.

"Each of the public black institutions has gained full regional accreditation. In addition, various schools, departments or programs in these institutions also have achieved accreditation. This historical record offers some evidence of the commitment and potential of the institutions for continued achievement with more adequate financial and professional support."

The Office for Advancement of Public Negro Colleges was first organized in 1968 with the support of a $50,000 grant from the Kellogg Foundation. Its mission has been to carry forward a broad program designed to help public Negro colleges increase their share of private voluntary support. The Office serves 33 colleges, including the black land-grant colleges, which enroll close to one-third of all black students in U.S. higher education and three-fifths of all students in predominantly Negro colleges.

The Kellogg Foundation has continued to support the Office since 1968 and has contributed a total of $321,500 to its support.

The Office of Economic Opportunity has contributed $290,000 to the National Association of State Universities and Land-Grant Colleges for the establishment of a Rural Community Assistance Consortium to provide training and technical assistance to black land-grant colleges to help them develop the expertise to become major contractors and grantees for rural community development programs. The consortium concept seeks to show that these colleges have the capability to play a greater service role for poor rural people.

Viability of the Black Colleges

The black land-grant institutions still suffer from a long period of invisibility and financial deprivation. State appropriations received by the colleges are not large enough to enable the institutions to "make the leap" necessary to strengthen various programs to a position of excellence or even distinction.

It has been suggested that the black land-grant institutions today are anachronisms and should be phased out.

Black educators disagree. They feel that the Negro college is better at motivating black students if only because it provides "role models"—black teachers who have achieved something important in spite of disadvantaged backgrounds similar to that of the student.

In addition, because of generally low costs and concern for individual student problems, public Negro colleges serve as "opportunity colleges" for many students from low-income families. The average parental income of students at these colleges is under $4,500—less than half that of other college students.

Among those vigorously opposing the proposition that the Negro college should be phased out is John Usher Monroe who, in 1967, left his post as dean of Harvard College to become director of freshman studies at Miles, a small black college in Birmingham, Alabama.

In a commencement address at the University of Michigan, Monroe said, "I would consider it foolish to think of dropping such institutions as the black community possesses on some theory that the white power structure institutions are going to do the necessary job for Black America. Our history as a society runs to the contrary."

The Picture Elsewhere

There has been a steady increase in the enrollment of black undergraduates in the predominantly white land-grant and state universities.

In fall, 1972, there were 84,518 full-time black undergraduates enrolled at 77 of these institutions, accounting for 5.2 percent of the total full-time enrollment. In 1970 black undergraduates made up only 3.4 percent of the total enrollment. Progress shown by individual universities reveals more striking success than the total figures indicate. In 1970 only twelve of the institutions surveyed reported black enrollemnts comprising five percent or more of the total student body. In 1972 the number had grown to 24.

Delaware State College student teacher conducts tutorial program.

Wayne State University had increased its Negro enrollment to 21.7 percent of its total enrollment and City University of New York to 19.1 percent. Rutgers University had a black enrollment of 12.9 percent and University of Illinois, Chicago Circle reported that 11 percent of its enrollment was black.

The figures present vigorous recruitment efforts on the part of state and land-grant institutions. Programs to help minorities vary from campus to campus. Basically they involve identifying promising young high school students and providing the support necessary to encourage them to continue with their schooling. This support includes counseling, help in overcoming academic deficiencies and financial aid.

Identification and recruitment programs are often led by minority undergraduates who canvass high schools and inner-city areas to inform prospective students of the opportunities available to them.

When a University of Virginia survey of black high school seniors showed that the principal influence affecting their choice of college was what black college students recommended, the university enlisted its own black students to lead its recruitment program. The university also appointed a black assistant dean of admissions.

The Massachusetts Institute of Technology doubled its enrollment of black students as a result of a nationwide search led by members of the university's Black Student Union under the direction of a black assistant director of admissions.

A number of other state and land-grant institutions have also employed members of minority groups to head up successful minority recruitment drives as part of admissions office staffs.

Many universities have developed programs that bring minority students onto their campuses for summer sessions which include instruction in basic academic subjects and in physical education, art, music, vocational-guidance and health. These broad remedial and enrichment programs hopefully prepare enrollees for college admission.

Once the disadvantaged student is enrolled in college every effort is made to assure his success. Besides continuing financial aid, certain courses are restructured to meet his needs. Grades are de-emphasized. Remedial classes, tutorial assistance, testing for special skills and deficiencies and individual counseling support the student.

The percentage of minority students enrolled at the graduate level does not match the percentage of undergraduates, but the obvious need for more trained professionals, especially in law and medicine, has spurred university efforts to try to remedy the situation.

As an example, the University of California San Francisco Medical Center seeks minority students to fill one-fourth of the openings in its freshman classes. This is a matter of policy, and to achieve its goal the Center conducts tireless recruitment campaigns and gives special preparatory courses for incoming students.

To aid graduate students in other fields, the public universities offer a wide range of fellowships especially earmarked for minority students.

These awards are given in such diverse areas as librarianship, public affairs, urban administration, community planning, engineering and education.

Minority Studies Programs

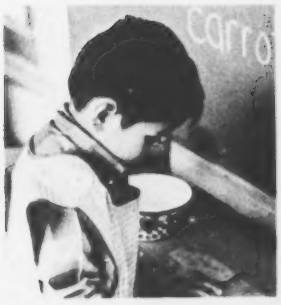
Many universities have made additions to the curriculum to meet the particular needs and interests of their minority students. Divisions of black studies include courses in African history, politics, language and Afro-American culture, philosophy, literature, history and music.

For the Mexican-Americans (With a U. S. population of eight million, they represent the nation's second largest minority group.), there are special departments of study in many universities.

The University of California offers comparative studies in Chicano, Asian and African cultures. A spo esman says, "These studies are as academically valid today as the studies in classical and European civilization have been to the university for the past century."

For many American Indians, raised on reservations, leaving home to attend college is tantamount to moving to a foreign country. They must adapt to different cultures and mores and at the same time compete in classrooms where courses are taught in English—often the Indian's "second" language. Universities with large Indian enrollments have special Indian School Divisions to aid these students and to adjust the academic curriculum to their needs.

Universities with large representations of other ethnic groups are also attempting to meet the needs of these students. In 1971, the University of Alaska added four courses on Alaskan native culture especially for its native students. The courses include: Aleut, Eskimo and Indian literature; Native Politics; Native Heritage and the Art of Skin Sewing.



Special program at University of North Dakota provides assistance to Indian students.

The University of Hawaii now offers a B.A. in Hawaiian studies inspired by the pure Hawaiian's resurging interest and pride in his ancestral culture. Courses offered are: Hawaiian language, history, botany, music, sociology and entomology.

Minority studies programs are, of course, open to all students and appeal to many Caucasian students who want to learn more about other cultures.

In such ways land-grant and state universities are trying to meet the needs of disadvantaged minorities. Though some may complain that progress is slow, still, progress is being made and often in spite of great obstacles.

A black Wayne State University administrator sums it up:
"Go as fast as you can, go as slow as you must, but go." As an afterthought, he adds, "And don't run scared."

VII Reaching Around the World

Reaching Around the World

State universities and land-grant institutions have always recognized that no great university can be parochial in its interests or composition.

Students from other states and nations have been welcomed. Even before the turn of the century a trickle of foreign students appeared on state university campuses. But the emerging colleges and universities were absorbed in the enormous development problems of their own nation. They made little effort to recruit foreign students or to cater to their special needs when they did arrive.

American scholars visiting abroad sometimes gave advice and guidance to overseas educators and government officials, but this was on an individual basis. The universities themselves were not actively involved in foreign service.

There were, however, at least two noteworthy exceptions to the general university isolationism. In 1876, the University of Massachusetts (then the Massachusetts State College of Agriculture) assisted with the development of Hokkaido University in Japan (And, in the process, introduced the soybean into the United States.). Cornell University, in the early 1920's, started its Cornell-in-China program, a pioneer enterprise in overseas technical assistance providing Chinese scientists with on-the-job training in plant breeding and crop improvement.

These two ventures foreshadowed what now is common-place—the trading of American university know-how in return for the enrichment of America's own universities by knowledge and insights gained abroad. Today large numbers of foreign students come to U.S. campuses. Tides of American students and scholars study abroad. And, at the same time, trained specialists, under university direction, are taking their skills and knowledge to developing nations around the globe.

The World Shrinks

The upsurge in university involvement overseas came at the conclusion of World War II when the world seemed to shrink and the United States was catapulted into the position of world leadership. In 1949 President Truman made his historic Point IV speech presenting his vision of American service to struggling new nations.

Only hours after the speech, John A. Hannah, then president both of Michigan State University and of the Association of Land-Grant Colleges and Universities (now the National Association of State Universities and Land-Grant Colleges), wired the President that the institutions he represented were ready to assist in making the dream a reality.

The President immediately accepted the offer. He named Oklahoma State University's president, Henry G. Gennett, first director of the Technical Cooperation Program (which was eventually succeeded by the Agency for International Development—AID). These agencies made it possible for the universities to extend their reach around the world to help other nations to develop new colleges and to use new educational, agricultural, engineering and industrial techniques.

State and land-grant universities were uniquely suited to the task.

They had themselves been created to meet the basic needs of their own developing country, which in the mid-Nineteenth century required the generation of whole new fields of knowledge plus more knowledge in existing fields and the training of men and women who could use that knowledge for the benefit of their communities.

Through trial and error, the state and land-grant universities perfected their "teach-research-extension" methods—methods remarkably appropriate to the needs of developing countries.

Addressing a meeting at the Land-Grant Centennial Convocation in 1962, the vice chancellor of an agricultural university in India said:

"Many undeveloped countries including my own, India, have an existing system of university education, but the fact remains that the system does not meet the needs of our people. We want a more dynamic approach—something nearer the aspirations of the bulk of our people—and it is this spirit of service to the community, a spirit introduced in your country by the land-grant college, that we would like to foster in our country.

"We want your know-how in bringing the results of science to every farm and every household. We want to give the same opportunities to the sons and daughters of our farmers and industrial classes that you gave to yours, and we want to adopt the methods which you have perfected. We want the assistance that only the land-grant colleges can provide."

For a quarter of a century the state and land-grant universities have been giving just such assistance in abundance.

Russell I. Thackrey, former executive director of the National Association of State Universities and Land-Grant Colleges, once declared: "It is no exaggeration to say that in all those countries of the free world which are striving toward a better life for their people, for the establishment of an educational and economic basis on which democracy can exist, the idea of the land-grant university is America's most popular export."

Kansas State University technician working with Indians.

How Universities Help

The overseas projects are as varied as they are numerous. They include assistance in building overseas schools and colleges, enlarging curricula, training and sometimes staffing faculties. They include research and direct aid in agricultural and industrial development, medical and veterinary services, non-formal education, vocational guidance, social and economic development, business training and public administration.

A major field of university endeavor at present is in AID-funded research principally directed toward a "War on Hunger."

Prairie View A and M, Cornell, North Carolina State and the universities of Hawaii and Puerto Rico form a consortium doing research related to tropical soils. Their studies are designed to increase the yield of soils in tropical and sub-tropical areas of the world where food crops are much needed.

At other universities researchers are seeking to turn famine-prone areas of the globe into bread baskets by such methods as: Educating farmers in proper fertilization and management of the soil; developing vast undeveloped lands; supplementing the world's cereal-based foods with proteins from vegetables, fish and chemical sources; improving irrigation methods; experimenting with new ways to process fish.

A second major field of university involvement is helping new nations build their own colleges and universities. It is hoped that, in time, these institutions will be the peers of American universities and will supply the emerging nations with their own skilled nationals to teach, train and lead their own people.

An outstanding example of aid in institution building was the land-grant type University of Nigeria, which was developed with the help of Michigan State University and the University of London. The university opened in 1960 with 220 students. Only six years later there were more than 2,500 students and 200 buildings. Michigan State's role was to help develop the university's philosophy and organization and to supply top teaching and administrative talent.

Colorado State, Kansas State and the University of Wisconsin are among other institutions which have been active in West African developing institutions which emphasize the land-grant concept.

In India, the universities of Illinois, Ohio State, Pennsylvania State, Missouri, Tennessee and Kansas State are each aiding at least one agricultural college in its development.

The University of Nebraska helped establish Kemal Ataturk University in Turkey. The University of Connecticut works with a budding university in Zambia. The University of Kentucky continues to help the University of Indonesia develop its colleges of agriculture and veterinary medicine.

In South America, Purdue University has been working in Brazil since 1952 with the Federal University of Vicosa. Purdue has organized programs in agriculture, home economics, forestry and veterinary medicine. The University of Houston for a number of years has been conducting a training program in Brazil and also has a worldwide contract for training with the Agency for International Development.

(opposite)
Land Tenure Center at University of Wisconsin assists natives throughout world with agricultural and rural development problems.

It is probable that the universities are achieving their most profound and lasting effect in working to strengthen these institutions abroad. They feel at home with what they are doing. They know their role. And they care deeply about the consequences of their involvement.

At the same time, they are enlarging the libraries and curricula of their own universities to include knowledge and interests acquired abroad and training their own students in fields of research previously unexplored.

West Virginia University horticulturist helped East African farmer develop only sweet corn crop in Uganda.

The Peace Corps

A well-publicized service provided by the land-grant colleges and state universities has been the training of Peace Corps volunteers.

With their recognized tradition of doing just the kind of work with people which the Corps hoped to perform, six out of the first ten universities asked to assist in volunteer training in 1961 were land-grant colleges.

Later the number of participating land-grant and state universities increased considerably, as did the training period and the courses of study required. The output of this university engagement serves developing nations in ways still unmeasured.

The Foreign Student

Another illustration of the international concern of state and land-grant institutions is the education of foreign students on American campuses. Even 20 years ago the foreign student in the United States was a rarity. In the academic year 1970-71 there were 144,708 foreign students enrolled in U.S. institutions of higher education—a seven percent increase over the previous year and an all-time high. Institutions belonging to the National Association of State Universities and Land-Grant Colleges enrolled 60,686 of these students or 41.93 percent of the total.

The University of California at Berkeley with 3,043 foreign students out of a total enrollment of 28,525 had the highest foreign student total enrollment of any of the NASULGC member universities. Foreign students comprised 10.7 percent of the total enrollment on that campus. The University of Illinois ranked second with 2,731 foreign students (4.9 percent) out of a total enrollment of 55,630.

In the old days, the foreign student on U.S. campuses made about as much impact as a new custodian in the maintenance department. He was perhaps invited to a Thanksgiving dinner or to a spring picnic. Other than that, he usually sank or swam on his own. Since language was so frequently a barrier, he often sank. Even if he managed to swin, he often returned home knowing little or nothing about the American way of life or what makes Americans "tick."

Today things are vastly different. Many universities provide special deans to assist the foreign student. International dimensions have been added to courses in the social sciences and other disciplines. On-campus hospitality and cultural centers are quite common.

The student is encouraged to serve as an intern in city, county, state and federal government offices; to participate in international seminars and institues; to organize world affairs study groups and to address community groups—in sum, to become an active participant in the affairs of this country.

Students from many nations come together at University of Hawaii's East-West Center.

Foreign students on campus introduce Americans to new foods.

American Students Abroad

While a growing number of foreign students are arriving on U.S. campuses, American students are going overseas in increasing numbers to study in foreign universities and, simultaneously, to develop an understanding of the needs, cultures and politics of other peoples.

During the 1969-70 academic year, there were 32,148 American students enrolled in foreign universities, a 28 percent increase over the previous year. At the same time, 6,291 American faculty members and scholars were studying abroad.

Besides traditional university-to-university cooperation in which individual institutions exchange faculties and students on a regular basis, a few centers for international communication are being established.

An outstanding example is the East-West Center in Hawaii, a federally-supported educational institution associated with the University of Hawaii.

Since it was established by the United States Congress in 1960 as "The Center for Cultural and Technical Interchange Between East and West," the center has hosted more than 15,000 Asian, Pacific and American students and scholars from more than 35 nations and territories.

For every two students or scholars who come to the center from Asia or the Pacific area, one American is selected for advanced study or research on federal grants.

There are some 700 degree students, senior scholars and non-degree students on campus at any one time, working for academic degrees, doing research or receiving advanced training in special skills. Academic and practical training goals are designed to carry out the Congressional mandate "to promote better relations and understanding between the United States and the nations of Asia and the Pacific through cooperative study, training and research."

The Space Science and Engineering Center at the University of Wisconsin in Madison is experimenting with communication by satellite as "the best hope for achieving person-to-person interaction among scholars, educators and researchers of many countries simultaneously."

The hope is that the world's knowledge and resources can be shared rapidly enough to reduce the widening educational disparity among nations.

Who Serves Whom

Despite the evident need and success of the various international programs, there remains some dissent concerning the proper role of universities in this general area.

The dissenters feel that the state and land-grant universities are exceeding their mandate, that when they were formed to serve the people that meant the American people. They feel that foreign affairs are properly the business of the government, not of the university, and that U. S. domestic problems are sufficiently compelling to engage universities' full resources for the time being.

Proponents reply that in serving foreign countries by providing direct assistance and by the exchange of students and scholars, the universities are, indeed, serving their own people.

In 1969, the Senate of the National Association of State Universities and Land-Grant Colleges assigned a task force to evaluate international development assistance and international education.

One of the task force conclusions was: "There is a fundamental relationship between developmental problems overseas and domestic developmental problems. The cleavage between the haves and the have-nots and the friction between races are essentially the same phenomena, whether on an international scale, or on a neighborhood scale. Some of the lessons learned overseas can have direct application at home, and vice-versa."

VIII
Women on Campus

Women's physical education class at Kansas State University undergoing military drill training.

Women on Campus

Discrimination against women in American colleges and universities has been called "massive and vicious" by a member of the Equal Employment Opportunity Commission. The nation's public universities are sensitive to the demands for affirmative action in the field of women's rights, and they are attempting to provide opportunities for women that will result in a more equitable share of responsibilities and benefits.

A self-inventory carried out at the City University of New York illustrates the problem. It revealed that while one in three Ph.D.'s at that institution were granted to women—compared to a national ratio of one in nine—only 14 full professors at the institution were women. Of CUNY's 15,111 faculty members, 4,568, or 30.2 percent, were women. This was better than the national norm of 22 percent. Only 48 out of 295 department chairmen at CUNY were women and there were only five women deans throughout the university's 20 units.

CUNY Chancellor Robert J. Kibbee summed up the efforts to equalize opportunities for women with this comment:

"We cannot rest content with the problem until sex as a criterion for recruitment, hiring, tenure, and promotion has been totally eliminated from every unit of the university including the central administration. Women represent a substantially under-utilized resource of skill and talent which our society can ill afford to neglect."

Some Changes for the Better

The outlook for women on campus has brightened since the United States Department of Labor ruled that all institutions receiving federal funds must show plans for eliminating discrimination on the basis of sex.

Faced with the possibility of losing federal assistance, land-grant and state universities are taking affirmative action to hire more women teachers, equalize their salaries, promote them to higher faculty positions, assign them to administrative posts and appoint them as heads of departments previously chaired solely by males.

A survey conducted by Dr. Margaret H. Arter of Arizona State University on "The Role of Women in Administration in State Universities and Land-Grant Colleges" revealed that during the 1970-71 academic year there was at least one woman in an administrative position on 61 state state and land-grant university campuses. However, there were 83 campuses with no women administrators. Among the institutions with women administrators there were two women presidents (at branches of City of University of New York), seven assistants to the president or chancellor, three vice-presidents or vice chancellors and three assistant vice presidents or assistant provosts.

Other administrative positions held by women included: dean, chairman or director of a division; assistant or associate dean; business or instructional officer; director of a school, academic program or other group or an assistant in one of these categories. The two categories in which there were the most female administrators were assistant or associate dean and director of a school, academic program or other program. There were 32 women holding positions in each of these categories.

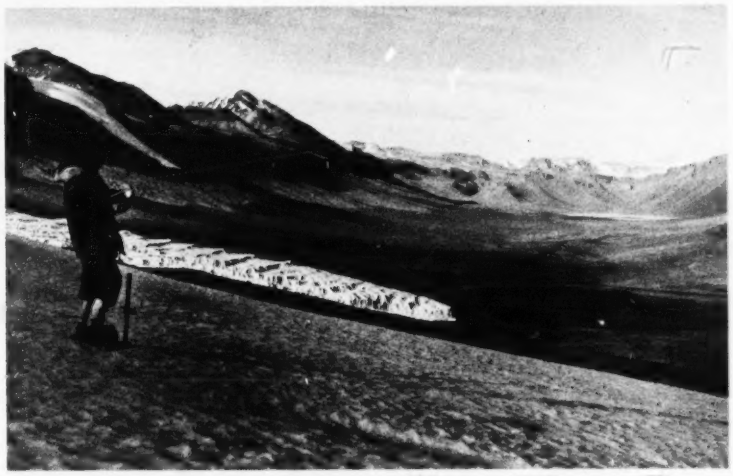
Since this survey, a number of women have been named to additional administrative posts at state and land-grant universities. A woman now holds the number two administrative position at the University of Nebraska at Lincoln. At Ohio State University a woman was named Executive Director of University Budgets—the university's chief budget officer.

The executice assistant to the president of Delaware State College is a woman who formerly was chairman of the college's English department. At Kent State University a woman was appointed as the university's first vice-president for public affairs and development.

Women were named as deans of the graduate school at both the University of Houston and the University of Minnesota. A woman also has been named dean of Minnesota's University College— a cross-disciplinary and experimental unit. At the University of Texas at Austin, appointment of the first woman ever to serve as chairman of a department in the university's College of Business Administration was announced early in 1972.

This is just a sampling of efforts to bring more women into positions of responsibility at state and land-grant universities. Although the number of women holding administration positions is still small, appointments within the past year show the commitment of these institutions to correcting this imbalance.

Ohio State University woman resident in aerospace medicine displays cooling device she helped develop for space suits.



Woman conducts glaciological study for Ohio State University's Institute of Polar Studies.

Offices to Represent Women

On many campuses, special offices have been set up to develop and implement affirmative action programs for women. Another common approach is to assign responsibilities in this area to the university's Office of Equal Employment Opportunity, which handles affirmative action programs for minority groups as well.

Whatever the administrative arrangement may be, such offices serve as vehicles for continual assessment of women's status on campus and at times as catalysts in the initiation of changes that will correct inequities.

The major task for most of these offices is to insure that the university is in compliance with the Department of Labor rulings. They handle complaints of sex discrimination within the university and recommend action to eliminate it.

Some universities, however, are developing innovative programs that go far beyond federal guidelines in their efforts to help women at all levels of university life raise their status.

The University of Wisconsin at Madison has undoubtedly been a leader in the entire field of affirmative action for women. Working without federal coercion—that is in the absence of any findings requiring them to take certain actions—the university has made giant strides in the area of equal rights for women. Under the direction of Dr. Cyrena Pondrom, who was named assistant to the chancellor to devote fulltime to the question of discrimination against women, the university carried out a two-year review of salaries of academic women. This resulted in equity increases in excess of one half million dollars. The university also set hiring goals that have resulted in women being named to 24 percent of all new positions at the level of assistant, associate or full professor within the past two years.

Other new university policies of benefit to women include:

A nepotism policy that prohibits discrimination on the basis of relationship.

The granting of tenure to persons who are employed on a parttime basis.

Through a Commission on Equity in Graduate Appointments and Support, the university has also reviewed its aid practices to graduate students with the goal of assuring that complete equity between the sexes is being practiced.

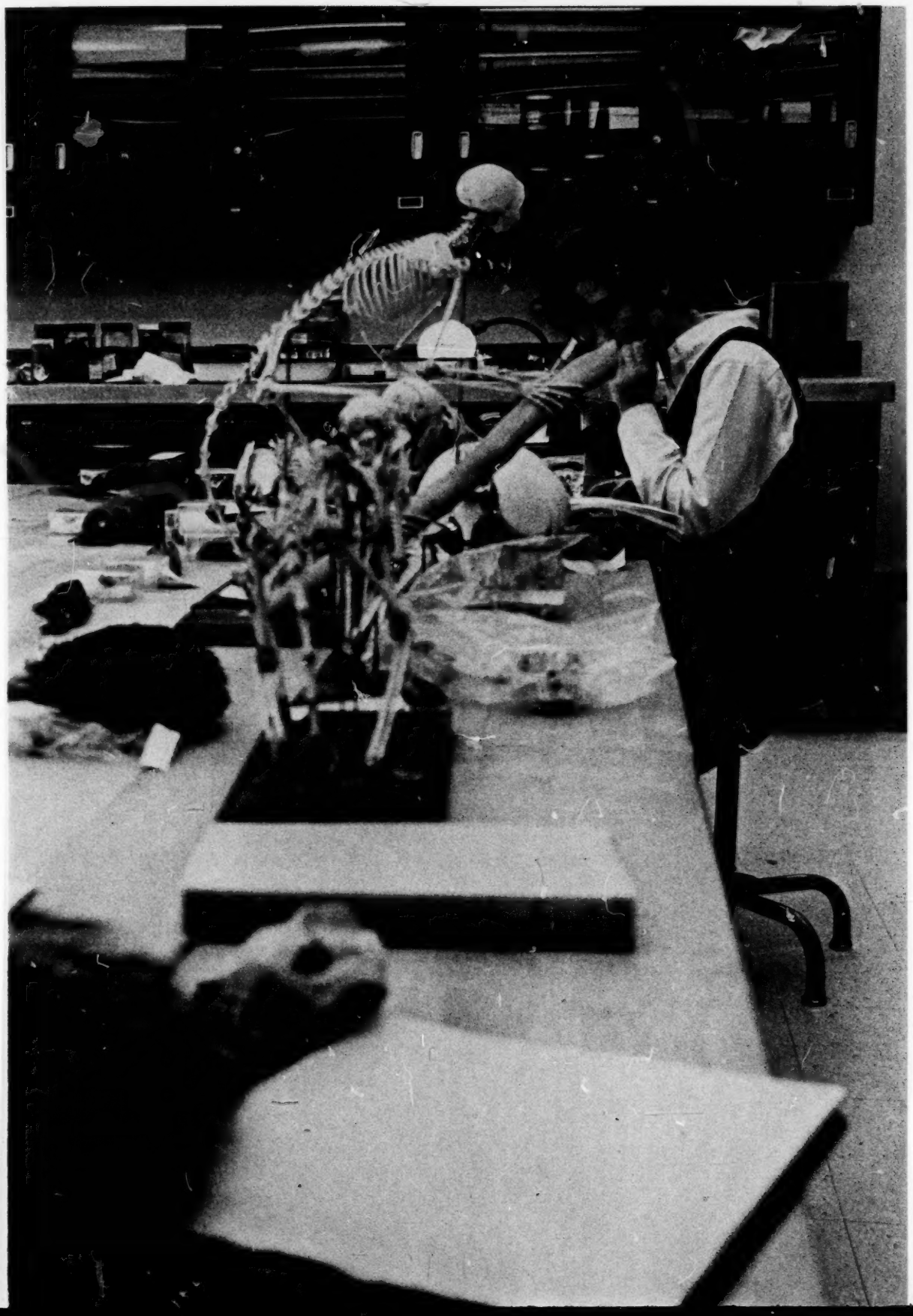
An instruction book for women in the classified civil service, providing information about how they can progress to higher assignments, was also prepared by the university.

"Our position is that we are committed to quality which means we are committed to equity," noted Dr. Pondrom, who also holds the rank of associate professor of English. "If we are overlooking persons simply because they are women, then this is a situation that we want to correct immediately. This represents a challenge that any high quality institution will respond to with alacrity."

In 1972 the University of Wisconsin System set up a unique central women's office. The wide-ranging responsibilities of the new unit include providing advisory services to officials of the central administration and chancellors of all campuses on programs, problems and issues related to women.

As part of its affirmative action program, the University of Minnesota has adopted a strong policy granting preference to women and members of ethnic minorities in filling administrative and other professional posts.

A university spokesman explained that efforts are being concentrated on jobs with maximum career opportunities because a campuswide study had revealed that even in those units employing a substantial number of women and minority group members "too often the distribution is skewed toward the lower end of the salary range."



Michigan State University, which has set specific hiring goals as part of its Affirmative Action Plan for Women, 1971-74, has also:

Named a seven-woman steering committee to design and recommend a permanent structure which can continually advise the university on the status of women on campus. Members were selected from a group of volunteers, representing faculty, staff and student constituencies.

Announced that it will provide individual and group training sessions to help non-academic women employees upgrade their abilities.

After a year-long study of the status of women on campus, the University of Miami (Ohio) set up an 11-woman commission. The group will promote the establishment of courses on women, develop a leadership training program and sponsor a program concerning women for the entire university. Similar groups are in existence at the University of Wisconsin at Madison and the University of California, Irvine.

Representatives from the community are part of the Advisory Committee on the Status of Women set up by Ohio State University. Private citizens serve along with representatives from faculty, non-teaching employees and student groups.

Special efforts to improve the status of women will undoubtedly multiply on campus during the coming years as universities move to implement recommendations of the scores of study commissions that have been set up to study the problem.

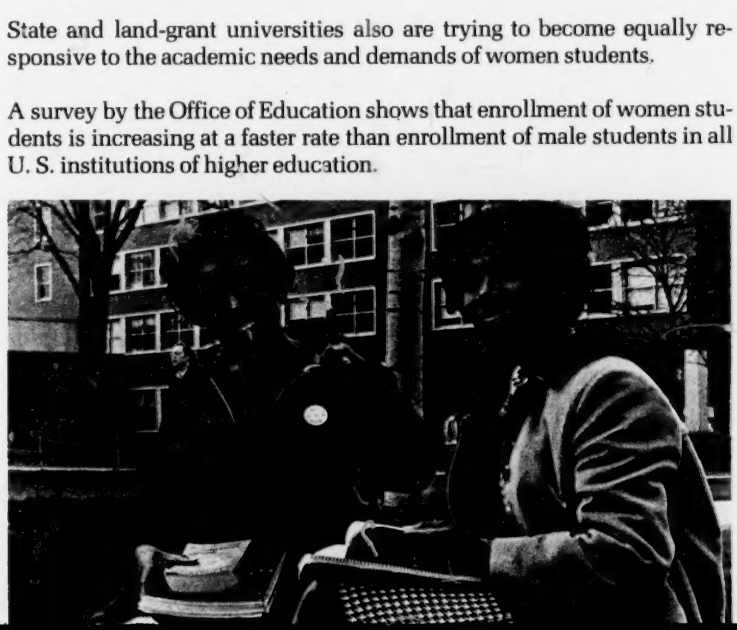
One of the earliest reports was issued by the Commission on the Status of Women at Wayne State University. Among the first of the commission's recommendations to be put into force was the establishment of a grievance procedure for women who believe they have been the victims of discrimination.

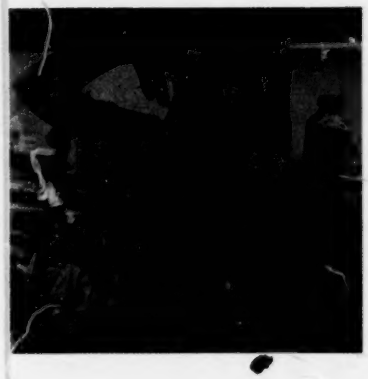
Salary adjustments where inequities exist and an impetus in the hiring of women will be other actions that study reports will encourage.

Women Students

State and land-grant universities also are trying to become equally responsive to the academic needs and demands of women students.

A survey by the Office of Education shows that enrollment of women students is increasing at a faster rate than enrollment of male students in all U. S. institutions of higher education.





In 1971, according to USOE figures, there were 3,782,291 women enrolled in all American colleges and universities—a 107 percent increase over the 1963 female enrollment. The number of male students increased during the same period by only 76 percent to a total of 5,242,741. Of the women enrolled in 1971, almost 1,100,000 were attending state and land-grant universities.

Special efforts to serve the unique needs of women students are being developed especially to stem the high female dropout rate. Pennsylvania State University has set up a post to represent women's views and to develop new programs for women students.

At the University of Idaho an ad hoc committee on women's programs has set up seminars for undergraduate women, high school visitations and workshops for high school counselors. The committee was established by university President Ernest W. Hartung after the Student Counseling Center and Student Advisory Services expressed concern over the withdrawal rate of women. It was found that over a four-year period, the total number of women in a class decreases by 51 percent while the total number of men decreases only three percent. This was due not only to the fact that more women withdraw but also that fewer women than men reenter or transfer into the university.

A number of colleges and universities which hold membership in the National Association of State Universities and Land-Grant Colleges now offer "women's studies." These emphasize the role of women in contemporary society and reflect a feeling on the part of many women faculty members and students that women have been ignored by most academic disciplines.

An early women's studies course offering was at Cornell University, which introduced "Evolution of the Female Personality" to an enthusiastic enrollment of 203 students, 30 of them men. The course covered such areas as women in history, the current status of women, the image of women and prospects for change. Coincidentally, Cornell changed the name of its Home Economics School to School of Human Ecology.

Wide-Ranging Courses

In addition to electing courses in women's studies, today's coeds are turning to such fields as forestry, pharmacy and architecture in large numbers. In some traditionally male fields, women students are actually being sought. An assistant dean at the University of Florida School of Engineering says, "We love them, but they don't love us."

World War I class in engineering mechanics at University of Wisconsin.

The dean points out that although women make up less than one percent of the total number of American engineers, tests show that there are two girls for every three boys who have an aptitude for careers in engineering.

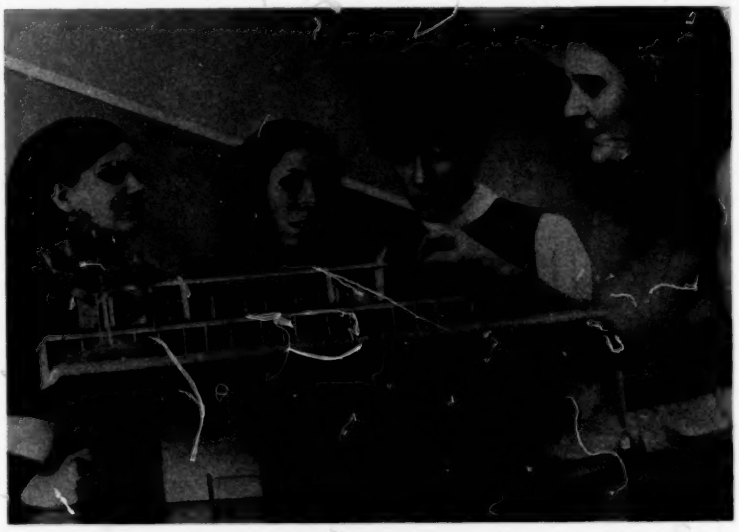
Yet, the University of North Dakota reports that 18 of its women students were studying engineering in 1971, increasing from an enrollment of five women in 1970. The University of California also reports that the enrollment curve for women engineering students has shown a substantial rise over the past five years.

Education and Home Economics

In spite of all the concern about women's new role in society, teacher training and home economics have not lost their appeal for women students.

Unfortunately, universities have been confronted with mounting numbers of applicants for teacher training at a time when there is a national surplus of teachers. As a result, colleges of education are limiting admissions and tightening requirements. State universities are revamping their curricula in an effort to channel students into study areas where job opportunities are expected to expand.

Such an area is home economics which, after more than a century of existence, is still enlarging its dimensions. An interesting comparison between home economics as it used to be and as it is today shows how the field has changed.



Design students at University of North Carolina, Greensboro seek new approaches to housing and land development.

The Old Days

A look at early catalogs at Michigan State University shows that the university in 1870 admitted 10 coeds. This made it one of the American pioneers in coeducation. At that time there were no such things as women's courses. The "ladies" were enrolled in the regular academic classes.

In lieu of agricultural labor in the afternoons, they worked in those days in the horticulture department, cutting seed potatoes, setting tomato plants and helping in the greenhouse. In 1896, a women's course in household economy was established. Here, promised the catalog,

Cooking class at Colorado State University experiments with cake baking.

Kansas State University early home ec class receives instruction in bed preparation.

"science would evolve a sweeter, saner mode of living, simplify and systematize duties and labors that at present hold our women in practical slavery, bring on premature exhaustion and old age, and take away from life all dignity." To avoid such horrors, 32 women enrolled in the first course. There was only one instructor. In the absence of suitable textbooks, she prepared a set of printed cards for each day's lesson. Following these outlines, students learned what they could of nutrition and of the principles of boiling, stewing, baking and broiling. They learned how to cook, how to wash dishes and how to set a table.

Meanwhile, in sewing class, they learned how to embroider samplers, apply a patch and, eventually, use the sewing machine. The social graces were not overlooked. The catalog explicitly promised "instruction in the accomplishments."

In 1902, education was added to the women's curriculum and teacher training became a vital part of the college's function.

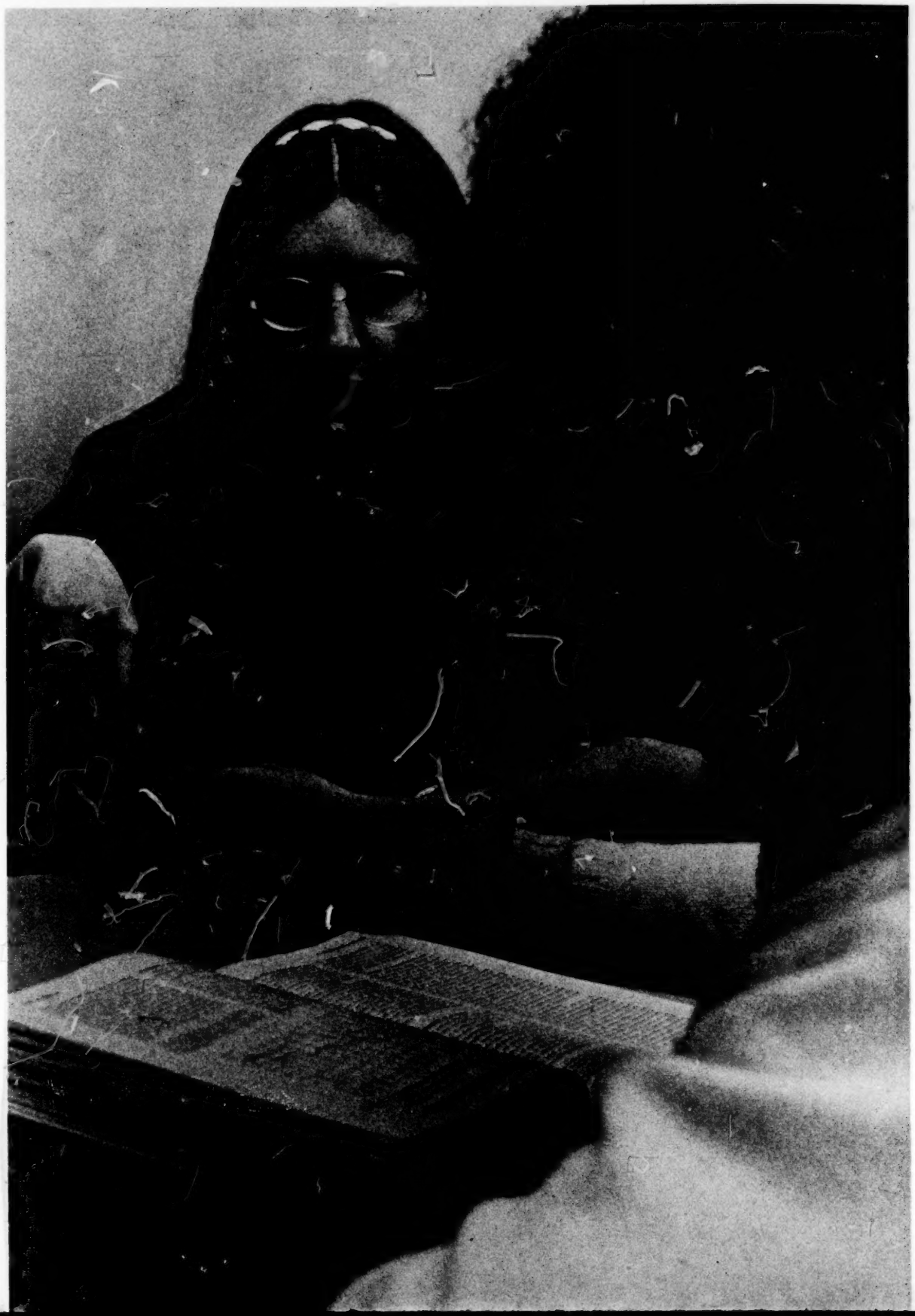
Turn now to a recent Michigan State University catalog. Subjects offered in its College of Home Economics include: Nutrition, child development, family relations, home management, family economics, clothing and textiles, applied art, community affairs, housing and home furnishing, institution administration, consumer research, news media writing, editing, advertising and restaurant management.

In addition, home economics students are required to take a core program in the biological and social sciences and in the humanities.

The Mature Woman

The state universities and land-grant colleges are not only concerned with undergraduates in expanding educational horizons and opportunities for women.

The older, mature woman who is interested in acquiring more education is receiving an increased share of attention at these institutions. This concern is evidenced by the establishment of a growing number of centers for the continuing education of women.



The activities of the University of Michigan Center for Continuing Education of Women – one of the oldest of such centers – illustrate the general role that these facilities play in helping the older woman return to academic pursuits. Opened in September, 1964, the Michigan center provides:

- General counseling for planning an educational program in relation to future goals.
- Help in adjusting academic schedules and planning parttime programs.
- Information on financial aid and assistance in obtaining such aid when possible.
- Information about promising fields of employment and advice on specific job opportunities.
- A library of special interest to adult women, including materials describing vocations and educational programs.

Activities of the center, however, go far beyond these efforts to help the individual woman student. The need to set up educational and employment opportunities of a type that are compatible with family responsibilities is an overriding goal. To achieve this end, the center has recommended adjustments in university regulations, procedures and programs, encouraged research leading to improved patterns of education and employment and worked in the community to increase parttime job opportunities. Conferences and workshops on subjects related to education for the professions and subprofessions and the preparation of special publications on these subjects also are aimed at achieving the center's goals.

Not all women who come to such centers for help are interested in completing degrees and preparing for careers. For example, the Women's Opportunities Center operated through the University of California, Irvine Extension as a free service for all adult women in the community has found that self-fulfillment is as least as important a goal for many women coming to them for help. In some cases, women are steered toward volunteer service opportunities.

The significance of programs to aid women in completing their educational objectives was summed up by a committee which recommended the establishment of the Women's Resource Center at the University of Utah. The committee report endorsed the establishment of the center "because the changing relationship between the sexes and the changing definition of the sex roles is one of the half-dozen great social issues of our time."

One concern which led to the creation of the Utah center was a 50 percent dropout rate for women undergraduates who complete the freshman year. The new unit exists specifically to promote in every way the full utilization of the talents of women. To this end, women-related research is encouraged in all appropriate departments and offices.

The University of Pittsburgh is carrying on an innovative program for women at the graduate level. With help from the Carnegie Corporation, the university makes fellowships available to women who want to prepare for careers in urban professions and in public administration. The program is designed especially to attract women of mid-career age whose family responsibilities have tapered off and who wish to prepare for careers in public service.

Special Conferences

Special conferences devoted to women's issues also are becoming more frequent on the campuses of state and land-grant universities. The University of Missouri, which began an extension program for the continuing education of women back in 1965, co-sponsored a major state conference with the state commission on the status of women, which drew 200 delegates to discuss women's contributions to the state's progress and prestige. A special national conference on "The Black Woman Challenges Society" was sponsored by the Black Women's Task Force at the University of Pittsburgh along with the Black Women's Association of Pittsburgh.

The University of Montana has sponsored a symposium on the status of women, which dealt with the concern surrounding the under-utilization of women's talents. The University of Maryland also held a symposium, this one on women's careers, and a series of workshops for women in conjunction with a number of community colleges.

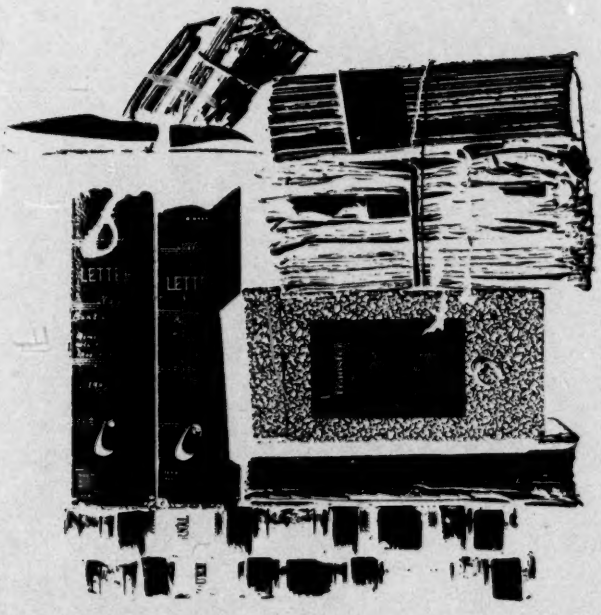
The University of North Carolina has sponsored a "Women's Week," featuring conferences and workshops on the role of women today. The State University of New York at Buffalo also sponsored a week-long women's seminar to encourage the development of a new "women's culture."

West Virginia University started a unique experiment in 1971 when it brought 75 women on campus for University Days for Women, a four-day "mini-college" experience. The days included classes, counseling sessions, dormitory living, campus tours, recreation and entertainment. The event was initiated jointly by major women's groups in the state. The program was so successful that it will be continued on an annual basis.

The University of Missouri at St. Louis, in a special brochure devoted to educational opportunities for women, summed up the current status of state and land-grant universities in their efforts to serve women better:

"Women's lib is obviously more than Virginia Slims and jumpsuits. It's not how far they've come, baby, it's how far they plan to go."

Epilogue



Public colleges and universities were created and exist today to serve public purposes. In their mid-19th century flowering, two purposes predominated. One was to provide the skills and brains required for the explosive development of an industrial economy. Sciences and professional disciplines were fashioned literally from scratch. The other was to expand opportunity for advanced education to thousands of young people who were not served by elitist institutions which prepared students only for teaching and preaching, medicine and law.

This book suggests the dimensions of their achievement. But it should end on a note of sober reminder that the record of yesterday will not serve the needs of tomorrow.

The goal of more nearly equal educational opportunity for all our people must be redefined by every generation. In our own generation it has been expanded to include the determination that no young person should be denied post-secondary education because he cannot afford it. Generous programs of assistance have been provided. The mushroom growth of community colleges has made the first two years physically accessible to many more youngsters. And they have responded. The 1960's saw the post-secondary school population increase by half. The public institutions did their part; where public and private institutions shared the students roughly equally in the late 1940's, by the end of this decade about 80 percent will be in the public.

In the generation ahead even more young people will be served, as institutions become more flexible in admission requirements, curricula and non-traditional ways of teaching. But the great expansion probably will come among those who are not young. People who need re-training because they have been made technologically obsolescent. People who want to enrich their lives but cannot become resident students. Community groups which need help in identifying and solving problems. Much of what was called "extension" will become part of the central concerns of the institutions.

A second development which is readily discernible is that the public universities are moving to the cities—that is, they are establishing urban campuses which are rapidly becoming major centers for all the diverse purposes of a university. It is true that major metropolitan areas have had their colleges all along and the new community colleges add to the diversity of opportunities. But the big state universities and the land-grant colleges—the institutions which have developed into the great public graduate, professional and research institutions—were located in rural areas. It is true that cities have grown up around many of them, but not the sprawling metropolitan areas with the multiplicity of problems and opportunities that only the great cities provide.

No one can say whether or how much these urban campuses can help the cities with their problems. In retrospect, expanding agricultural productivity many times over—a miracle of science and teaching—seems relatively simple compared to the complexity of interrelated problems that must be solved by urban man. But what bridges the gap between the one-building campuses with which we began and the giant establishments we have become is the unchanging role of the public university. That is to foster the discovery of new knowledge, to disseminate that knowledge as broadly and effectively as possible and to serve the public in ways which utilize the special capabilities of the university. University people must never think that they are the community or its government. They must never forget that their function is to serve the community and its government.

Ralph K. Huitt
Executive Director
National Association of State
Universities and Land-Grant Colleges